THE GLASS INDUSTRY

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GLASS DIVISION ACTIVITIES AT THE 55TH ANNUAL A.C.S. MEETING

The 55th Annual Meeting of the American Ceramic Society was held at the Statler Hotel, New York City, April 26-30, 1953. The last meeting held in New York City was in the Spring of 1950.

This meeting was one of the best attended in the history of the A.C.S. with over 2100 registered. The list of distinguished visitors included F. Winks, Director of Beatson-Clark & Company, Rotherham, Yorkshire, England; David G. Osborne, General Electric Ltd.; and Jaime Lozano, Vidriera Monterrey, Monterrey, Mexico.

R. R. Danielson, Manager Ceramic Service of Metal & Thermit Corporation, newly-elected president of The American Ceramic Society, assumed the duties of the office for the year 1953-1954 from the former President W. E. Cramer. He has been a member of the Society since 1915 and is one of the initial hundred Fellows of the Society.

Mr. Danielson has served as Secretary of the Enamel Division, 1918-1924; Chairman of the Enamel Division, 1924-1925; a member of the Board of Trustees of the Society, 1923-1928; and Vice President of the Society from 1928-1929.

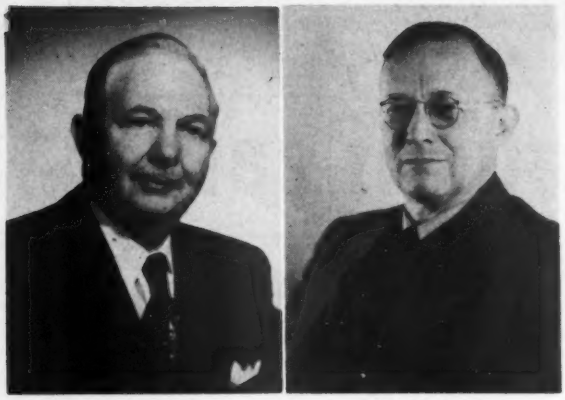
F. V. Tooley, University of Illinois; W. H. Manring, The Calumite Company; N. J. Kreidl, Bausch and Lomb Optical Company; F. L. Bishop, American Window Glass Company; and A. C. Siefert, Owens-Corning Fiberglas Corp. presided as Chairmen during various sessions of the glass meeting. The program, consisting of eighteen papers ("Illustrative Lecture Material" by Alexander Silverman was withdrawn) provided by a committee under the chairmanship of W. H. Manring, was well-balanced to include both the theoretical and practical aspects of glass technology. There were several theoretical papers related to the strength and structure of glass, as well as practical papers involving melting and instrument control of glass forehearths.

The first paper, "Determination of Potassium in Glass with the Hydrogen Flame Photometer," was presented by Paul Close and M. T. Watson, Jr., Owens-Illinois Glass Company. This paper, read by the senior author, described the adaption of the flame photometer for the analysis of glass. The Beckman Model DU spectrophotometer was recommended for the determination of K in the range of 0.01 to 2.5% K_2O. The effects of varying concentrations of Na, Ca, Mg, Ba, Zn, Al, and Fe on the K flame emission were also discussed. A sample of approximately 0.1 gm. was recommended, and the precision is believed to be better than that afforded by the usual chemical analyses. The development of this method of analysis offers much promise in the future.

The second paper, "Are Convection Currents Good?," by Larry Penberthy, Penberthy Instrument Company, was presented by Mr. Penberthy. The controversial subject of convection currents in a glass tank was discussed. The author inquired whether convection currents should be (1) slowed down, (2) speeded up, (3) stopped, (4) reversed, or (5) relocated. It was his opinion that convection currents in general are more detrimental than good; that is, attack on refractories and defects such as stones, cords, and seeds, together with presence of stagnant glass, are the results of too much convection activity. Electric boosting from carefully placed electrodes is believed to slow down convection currents. Other recommendations were reduction in depth of tank, additional compartments in the tank with possibly extra bridgewalls, and the use of an intermediate-level throat. It was predicted that commercial glass melting will soon be accomplished with only half the usual number of sq. ft. per ton now employed. The control and regulation of convection currents are of vital importance and may be the subject of much beneficial work in the future.

Dr. Frank W. Preston pointed out that turbulence as such in a glass tank is not possible owing to the high viscosity of the glass. The convection currents are due primarily to differences in density of the glass which are more readily influenced by its gas content because the gas content is more susceptible to varying temperature levels.

Another paper, "The Efficiencies of Three Kinds of Glass in Shielding Against Atomic Radiations," by K. M. Laing and J. J. Bonino, Pittsburgh Plate Glass Company, was presented by Mr. Laing. This paper showed the need for research in glass as related to atomic energy. Glasses not only offer a barrier to atomic radiation, but they also



R. R. Danielson J. T. Littleton

maintain a transparency for visible light as well. These facts make glass unique among various shielding materials. Three types of glass were considered for this purpose: (1) plate glass, (2) high lead and barium glasses, and (3) non-browning glasses containing cerium. Where a thin shield is desired, the high lead and barium glasses are best. Where economy is the prime consideration, plate glass is desirable, while non-browning glasses are recommended where darkening is a hazard. From the curves presented and from a simple formula, transparent shields can be evaluated and specified.

The paper, "Mold Irons and the Glass Mold Situation," by Earl Flatter, Overmyer Mould Company, indicated the extensive research that has been conducted in the field of metallurgy directed toward improved glass molds. The essential requirements of a good mold are that it be readily machined, that it take a high polish, and that it not oxidize too readily. Glass temperatures reaching the mold vary from 2100-2600°F. A soft, high carbon chilled mold is, as a rule, suitable and usually meets the requirements satisfactorily.

Alloying agents such as chrome, nickel, and molybdenum have proved most useful. The structure is highly important, and nickel-chrome combinations are highly desirable.

Colmonoy No. 6, an alloy of Ni, Cr, and B, used as a sprayed coating approximately .060", has shown high resistance to oxidation and excellent wetting characteristics. It may be readily bonded to various irons and alloys.

The use of the basic-lime cupola process has recently shown certain advantages in mold making. Recently the development of a nodular type graphite iron has given indications of solving some of the more critical glass mold problems. Its resistance to growth and scaling at elevated temperatures is far superior to normal flake-type irons, and its unique ductile property makes it more resistant to shock impact.

The next paper, "An Instrument for the Measurement and Control of the Level of Molten Glass in Tanks," was presented by C. L. Roberson, Owens-Corning Fiberglas Corp.

An instrument was described which permits continuous, automatic measurement of tank glass level with accuracies better than one-hundredth of an inch. It has been employed with glasses having viscosities ranging from 50 to 750 poises at operating temperatures of from 1000° to 1550°C. It is well-adapted for forehearth structure, easy to maintain, and rugged in construction. The probe arm utilizes only a small amount of platinum tubing at its end and is connected with a sequential control circuit. The instrument employs a balanced pneumatic circuit which is actuated by a water-cooled probe as it meets the glass surface. A special fluid-type switch, used in conjunction with a highly sensitive electronic relay, provides a pressure detector free of hysteresis and other mechanical limitations. The pneumatic control is provided with tight sealing that makes it free of pressure changes, electrical grounds, and contamination. Also connected in the circuit are alarm stations to indicate any failure of operation.

The use of the instrument showed a remarkable improvement in glass level with a 75% reduction in stone contamination. Improved operation, improved quality, and decrease in costs of melting were evident.

The next paper, "Automatic Control of Glass Forehearths," by J. R. Green, Minneapolis-Honeywell Regulator Corp., Brown Instrument Division, was one with an immediate industrial application. After showing modern developments in the control and regulation of forehearths of glass furnaces, Mr. Green predicted that the all-automatic factory operated by a single man may be a possibility some time in the future. This factory would be entirely automatically controlled from feeding of raw batch, to melting, forming, annealing, and packing.

Over 500 forehearths are now being operated under controlled conditions. The glass is conditioned as it enters the forehearth, with the temperature carefully regulated. It is then delivered to the forming machines at the desired temperature and viscosity.

Each factor of operation, i.e., refiner temperature, glass level, glass temperature, and gradients, can be controlled by modern systems, operating upon a variety of principles which are illustrated and described. The economic considerations, both in manpower and investment, were analyzed in terms of final gross profits. Based upon the present extensive usage of automatic regulation, some predictions were made concerning possible future trends and developments.

Another paper of practical interest, "New Developments in Copper-Silver Stains," was presented by O. S. Levi, Verd-A-Ray Corporation. Some interesting and attractive colors were shown by Mr. Levi developed through the use of copper and silver in the presence of Cl. A wide variety of red and green colors was also shown to be possible through variations in the proportions of copper and silver in the presence of Zn ions. The colors were controllable and reproducible when applied to soda-lime glass as a base. The paper further demonstrated that any salt of a metal was useful in enhancing the color providing reaction with Cl takes place. Other halogens were not found as useful as Cl.

The next paper, "The Color and Spectral Transmittance of Amber Bottle Glass," by F. R. Bacon and C. J. Billian, Owens-Illinois Glass Company, was presented by Mr. Billian. The color and spectral transmittance of 35 different bottle glasses were studied in order to compare their color uniformity. It was found that the psychological attributes of color (C.I.E. system), as computed from complete light transmittance spectra, can actually be estimated with good accuracy from transmittance at only two suitable wavelengths, 550 and 650mμ. Transmittance at 550 mμ is closely correlated with bright-

(*Continued on page* 308)

Norbert I. Reich

Hugh L. Kline and Roy Nyquist

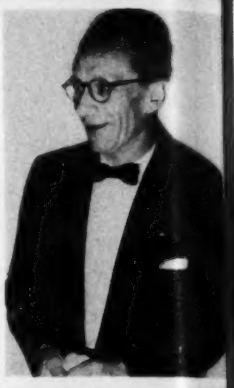
Dr. and Mrs. J. W. Londeree

Left above: James Craig and Henry W. Walker

Right above: Wm. Bramlett, Jr., and Robt. W. Higley

Right: Carl Uhrmann

Left: Jaime Lozano Rocha and Wm. Silverman



Richard Iander and Harvard Olson

Ormund Rugg

Gene Coole

Roy Horning

Larry Penberthy, George Kellenberger, and Val P. Shellenberger

T. H. Cheung and David Craig

R. W. Ricker

S. R. Scholes

John Mochel

Mr. and Mrs. Thomas Montgomery

Mario Salinas

R. R. Rough

Wm. Poundstone

E. E. Humphrey and E. L. Woodall

GLASSMEN RELAX BETWEEN SESSIONS

PHOTOS BY HUGH L. KLINE

Ralph Brenner, Harold Baque, and John T. Ogden

Charles E. Stelego and Howard R. Swift

Mr. and Mrs. Wm. C. Cooke

F. V. Tooley and Mrs. Harold Baque

Howard Vormelker, Raul Gonzolez, and Jaime Lozano Rocha

O. Behrend, Frank Smith, and Gerald Reinker

Hideo Yamamoto and Donald W. Ross

Wm. Fabianic and James Coleman

Paul Morris

Arthur W. Schmid

Henry Moore

Arthur Dirlam

Wm. Manring

J. C. Hostetter

Percy Cole

Charles Cala

S. A. Forter

ness (C.I.E) and thus is sufficient to characterize color intensity, the most important variable of color quality among commercial amber glasses. There is also fair correlation between transmittance at 550 mμ and transmittance in the ultraviolet. The latter is important in the avoidance of photochemical action on bottled products. Incidental to this work, the transmittances of a large number of glasses were compared with their iron and sulfur contents. Broadly speaking, it was found that transmittance at 550 mμ decreases with increasing ferrous iron or with increasing sulfide content. This transmittance is also affected substantially by other factors, such as gross composition, minor constituents like fluorine, and thermal history. Transmittance at 1050 mμ can be correlated closely with ferrous iron content (as determined by chemical analysis), and absorbancy per unit concentration of ferrous iron in carbon-sulfur ambers is about the same as in green glasses containing no sulfur.

Another paper, "Iron Colors in Sulfur-Free Glasses," by Valjee Suraiya and S. R. Scholes, was presented by S. R. Scholes. Glasses of varying iron content were melted from raw materials free from sulfur. Limestone was carefully purified in order to eliminate the sulfur. No brown or gray glasses were obtained from this study, and it was concluded that where such colors are obtained with iron-bearing glasses it might be due to complementary colors produced by the formation FeS.

The next paper was "Re-Evaluation of Glass Viscosities at the Annealing and Strain Points," by H. R. Lillie, Corning Glass Works. A review of tests used in the determination of "annealing" and "strain points" was presented. Many factors were considered, such as (1) length of rod, (2) support of rod, (3) method of observing elongation of rod, (4) accuracy of temperature measurement, and (5) correction for expansivity of glasses. Present tests with refined and modern apparatus indicate that the definition be changed. It was recommended that "annealing point" be considered at log N = 13.00 and "strain point" be considered at log N = 14.50.

The discussion which followed was concerned primarily with the effect of varying the weight used on the rod during the test. No complete agreement was reached concerning the importance of this factor.

A paper from the National Bureau of Standards, "Viscosity and Electrical Resistivity of Molten Alkali Borates," by L. Shartsis, W. Capps, and S. Spinner, was presented by Mr. Capps. Extensive tests were made to determine the viscosity and electrical resistance in the systems Li_2O-B_2O_3, Na_2O-B_2O_3, and K_2O-B_2O_3 in the temperature range 600 to 1000°C. The log viscosity curves showed a minimum in the low-alkali region followed by a maximum as the alkali was increased. The effect was explained by postulating an equilibrium between two antithetical effects caused by addition of alkali oxide to B_2O_3. The log electrical resistance isotherms decreased rapidly with increased alkali content up to about five equivalents of alkali ions per liter and decreased less rapidly in a linear fashion with further increase in alkali ion concentration. The equivalent conductance increased with alkali concentration, indicating behavior rather typical of liquids of low dielectric constant. The rate of increase of equivalent conductance was greater in the concentration region where the viscosity was increasing than where the viscosity was decreasing, thus illustrating that viscosity is not a controlling factor in electrical conduction. The hypothesis that electrical resistance and viscosity of each glass were both related to the concentration of weak bonds in that glass was advanced to account for the constancy of the relation between the temperature coefficients of the two properties.

Another theoretical paper, "A Flow Distribution Function and Its Implications," by D. A. Stuart, Cornell University, and O. L. Anderson, Bell Telephone Laboratories, was presented by Mr. Stuart. This paper was based on mathematical functions concerning the distribution of cracks that ultimately cause the failure of glass. By assuming a stress concentration factor for the cracks, the authors advanced a theory which makes it possible to compute the crack distribution functions from fracture tests, as indicated by Shand.

It was shown that the micro strength of semi-infinite solids in plate glass was not the same as the strength of fibers. Implications were made that this variation was due to a difference in structure of the two. Discussion, however, indicated that this difference might be due to thermal history.

A continuation of the theoretical aspects involved in determining the strength of glass was made in the next paper, "Experimental Study of the Fracture of Glass II" by E. B. Shand, Corning Glass Works. This paper was a continuation of the work initially reported by Mr. Shand at the Fall Glass Division Meeting. Through a study of the results of many strength tests on glass a concept of fracture propagation was developed. Evidence showed that fractures of glass originate at pre-existing flaws or cracks, nearly all of which were to be found at the surface. Further evidence indicated that the local stress at the crack must exceed some minimum value before the crack will start to propagate, and that even when this minimum stress was exceeded to a large degree, the initial rate of propagation will be of a relatively low velocity. As the crack expanded, its forward velocity increased because of the increase of local stress in relation to the applied force. Thus, the rate of propagation was shown to be a function of the local stress. Before this condition was reached, the fracture surface was found to be a smooth plane "mirror," but beyond this stage it exhibited "hackles," forking, or shattering, which represented additional surface area required to absorb an excess of elastic energy released in the process. From the analysis of specific test data, the critical stress was estimated to be between 2.5 and 5 million lb./sq. in. It was further demonstrated that for any particular glass this stress was independent of test conditions. It was concluded that the critical stress represented the intrinsic strength of the body of the glass when removed from the vicinity of flaws.

A paper of more practical interest, "The Action of Hydrochloric Acid Solutions on Borosilicate and Soda-Lime Glass Bottles," by F. C. Raggon and F. R. Bacon, Owens-Illinois Glass Company, was presented by the senior author. The extraction of Na_2O and SiO_2 by acid ranging from 0.0002 to 6.0 N HCl at 70°C. was determined on a number of commercial bottles. With increasing concentration of HCl (a) the extraction of soda increased for borosilicate bottles but was practically constant for soda-lime bottles, and (b) the extraction of silicate increased for both, but the increase for borosilicate bottles was more prominent. The extraction of silica by

(*Continued on page* 334)

THE DESIGN, CONSTRUCTION, AND OPERATION OF OIL BURNERS FOR GLASS MELTING

By THOMAS COYLE, Superintendent of Glass Melting

Maryland Glass Corporation, Baltimore, Maryland

The burner system for discussion was engineered in the Maryland Glass plant in the year of 1924, by the Lalor Fuel System Company of Baltimore, Maryland. The burner system comprises three major parts: (1) The burner construction and operation; (2) The port design; and (3) The centrifuging, pumping, and preheating of the heavy oil.

The burner is somewhat of a gun shape design consisting of an outer casting housing approximately 4½ inches long, 6¼ inches high, and 2¼ inches thick.

At the back of this housing, on its center line, is a tapped hole 1¼ inches long by ⅞ of an inch diameter for 20 U.S.F. pipe threads, used for the heavy oil supply. At the upper back of this housing is a ½ inch Briggs tapped hole used for a ½ inch pipe connection which supplies the compressed air to the inner air chamber of the burner. At the front face of this housing is a hole 7/16 of an inch long by ⅞ of an inch in diameter tapped for 7 U.S.F. pipe threads which holds the hexagon shaped outer atomization air nut.

The housing of the burner also contains a circular lug on the bottom, 1⅜ inches long by 1½ inches in diameter, with a Dowell pin fitted into the lug, which seats in the base holder casting. The Dowell pin is ⅜ of an inch in diameter and ⅜ of an inch long.

The next part of the burner is a nozzle chuck, 3⅞ inches long by ⅞ of an inch in diameter made of brass, with a ½ inch by 1⅛ inch hexagon lock nut, threaded with 1⅜ inches of U.S.F. pipe threads to fit in the center hole of the housing of the burner and tapped with 20 inner U.S.F. threads, ½ inch in diameter to hold the inner oil and atomization tip.

The hexagon lock nut of this nozzle chuck, when fastened against the back of the burner housing, leaves a space 9/32 of an inch to be formed in front of the oil tip and the outer atomization nut so that the inner compressed air and the oil stream are combined before flowing from the burner. The back end of the nozzle chuck has a ½ inch Briggs thread for hose connection and has a ¼ of an inch oil orifice hole which extends through the chuck to the oil tip of the burner. The inner oil and air atomization tip, made of brass, is 2 inches long with the back ¾ of an inch threaded for 10 U.S.F. pipe threads ½ inch in diameter. The middle section has a hexagon nut ⅛ of an inch thick to fit a box wrench so that the tip can be unscrewed for cleaning.

The front 1⅛ inch section of the inner tip is tapered to ⅜ of an inch and has 8 equally spaced air slots 1/16 of an inch wide by 1/16 of an inch deep on the upper front surface and has a ⅜ inch solid face for drilling the orifice size diameter of the tip. The outer front of the burner housing contains a 12 square hole (each hole 1/16″ x 1/16″ square) hexagon shaped lock nut 11/32 of an inch thick by 1⅛ inches wide with 7⅞ inch diameter U.S.F. threads, made of cold rolled steel used to supply the outer atomization of the burner.

The burner housing circular lug with the ⅜ inch Dowell pin fits in a cast iron holder which has ⅜ of an inch key slot 1-3/16 inches deep to keep the burner from turning in its seat. The burner holder is 4 inches high and 2½ inches in diameter with ¼ inch wall thickness and is connected to a cast iron bracket 4½″ wide x 5½″ long x 4″ high by means of a ⅝″ steel bracket bolt which acts as the hinge for the burner flame adjustments. There is a ½″ steel rod with lock nuts and frame which is brazed to the cast burner holder and permits the flame angle adjustments to be made 15 inches from the front of the burner and which also permits the burner bracket to be bolted down in its proper location to the port steel channel.

The burner hose, both for the oil and the compressed air, are ½″ in diameter, bronze solid ferrule construction, 33″ long fitted with brass unions.

The port, which is designed for this type of burner firing, is somewhat of a Dutch oven construction built from the furnace port opening to the back wall of the regenerator. Its width is held the same as the furnace entrance opening, so that the port neck has the same area with no chokage and permits the gases to evolve over the top of the entire checkers.

The burner blocks of fused cast material 12″ high x 9″ wide is of special design. The top half is 4″ thick and the bottom half 6″ thick with a hole designed for the angle of the flame. The burner block is placed on a fused cast burner arch 20″ from the top of the port bottom and 42″ from the inside face of a 12″ breast wall, which location determines the distance of 47½″ that the burner fires outside the furnace. This port design was incorporated in the new furnace which would be similar to a producer gas or natural gas port.

Two burners firing on the No. 1 port, No. 4 furnace.

Presented before the Thirteenth Conference on Glass Problems, Ohio State University, Columbus, Ohio.

The Dutch oven construction port built in a natural or producer gas regenerative type system.

The flame, fired through these ports, is circular, about ½″ in diameter at the front of the burner, about 14″ in diameter at the furnace port entrance, which clears the relief silica arch of the crown by 12″ and the port bottom by 8″ so that the flame can impinge on the glass surface half way across, then fans out to a very good fire about 6 feet in width. The flame is in complete combustion about 2 feet from the opposite side of the furnace blocks and is held on the surface of the glass so that the maximum emissivity of the flame can be absorbed by top layers of the glass. The breast wall and ports are always in very good condition after three years of service.

The heavy bunker "C" oil is a #6 Bunker "C" fuel, A.P.I. 10 to 13 gravity, viscosity Saybolt 122°F.—100 seconds, B.T.U.'s 150,000, B.S. from 0.15 to ½% open flash 200°F+, sulphur content under 1%. The heavy Bunker "C" oil is unloaded from heated tank trucks (5,000 gals. capacity), which have armored flexible hose to connect a 4″ pipe line extended to the unloading pump. A ¾″ steam line inside the 4″ line keeps the oil hot enough to flow through the line to the oil storage tanks of about 70,000 gallons capacity.

The storage tanks are insulated on the entire outside with a 1″ rock wool blanket, which in turn is covered with sheet metal for protection. The tanks are equipped with U vent pipes about 12 feet high. There are steam coils in the bottom of the storage tanks which enable the temperature in the tanks to be kept at 180°F. at all times.

An electric Dukehart Viking centrifugal pump, equipped with a 1 H.P. motor, keeps the heavy oil circulating in the storage tanks at all times. These tanks are connected together by a 6″ line 3 feet from the bottom. The heavy oil is drawn out from the bottom of the tanks through a 2″ line and pumped back into the top of the tanks.

The heavy oil is cleaned of B.S. by closing a valve in the circulating line and another valve opened in the line leading to the centrifuge. Two Sharples centrifuges with geared head and 3 H.P. motors are used with bowl travel of 13,000 R.P.M. which clean 5½ to 6 gallons of oil per minute per centrifuge. The cleaned oil from the centrifuges is piped to a clean oil storage tank of 20,000 gallon capacity and is kept at a temperature of 130°F.

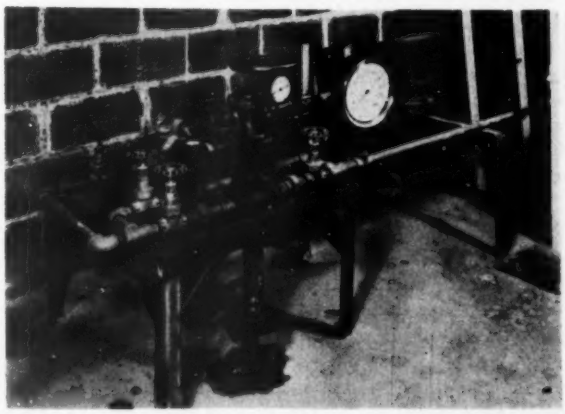
The oil at 130°F. is syphoned from the clean storage tank to two 2½″ Quinby screw pumps, each having a speed of 1150 R.P.M. driven by a 5 H.P. motor, direct connected with a flexible coupling. There are two 350# American Schaeffer regulating valves installed in the 2″ line after the pumps and are set for a pressure of 200# which keeps a head pressure on the 2″ line to the factory of 200# at all times. The heavy oil supply lines at the furnaces are dead end systems, which causes the oil not passing through the factory main line to return to the clean storage tank. There is a 4½″ Worthington steam-operated pump piped into the main line to be used in case of an electric current failure.

A 2″ *extra* heavy pipe covered with hair felt connects the line from the pumps to four Coen Preheators in the basement of the factory. The preheators boost the temperature of the oil from 130° to 240°F. and is piped to the back platforms of the furnaces.

The oil then flows through a 1″ Lalor safety valve, to one of two heavy oil strainers, one in use while the other is cleaned, to a 1″ regulating valve which reduces the oil pressure from 200# to a pressure of 35# above the controlled pressure on the control board, to two preheators which boosts the oil temperature to 230°F.; to an electrical flow meter which is connected to the indicating and recording instruments and totalizer on the control panel; to a ½″ Fischer control valve for pressure control or a Connaflow valve for flow control, then through a mechanical Buffalo meter; thence to a pair of ¾″ Everlasting gate valves which are located exactly on the center line of each furnace so that the resistance of flow in each line to the burners is the same.

The compressed air, for atomization of the heavy oil in the burners, is piped to the crown of the furnaces where it passes through nine lengths of 2″ pipe, with return bends, which increases the temperature of the air to about 190°F. The hot compressed air is then piped to the furnace platforms through a 2″ Fischer regulating valve to the air control instrument of the panel; then through 2″ Crane gate lever reversing valves to the burners.

There are ½″ bypass lines equipped with hand-operated globe valves around the reversing valves which allow approximately 8# of compressed air to flow to the



The front part of the heavy oil system where the oil feed pressure line connects to the reducing valve and strainers.

burners not firing on the opposite side, which keeps the tips of the burners cool preventing the formation of carbon on the face of the burners.

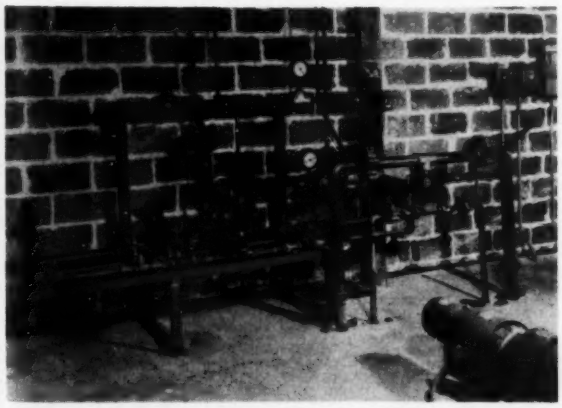
The volume of the primary air discharged through the burner orifices in cubic feet of free air at Standard atmospheric pressure of 14.7 lbs. per sq. inch, figured on 20-1/16" slots is 0.078120 sq. in. area, or 58.4 cu. ft. per minute at a pressure of 24 lbs. per sq. in. for each burner. The volume for 5 burners, on one furnace, for 24-hour period is 420,480 cu. ft. The volume of the secondary air for combustion figured on 1400 cu. ft. per gallon of oil, with 85% carbon, 13% hydrogen, and 1% sulphur, the type of heavy oil used through these burners, is approximately, on 5 sq. ft. pulls, 7,280,000 cu. ft. per 24-hour period, so that the primary discharged air is about 5 to 6% in volume of the secondary air for combustion.

By means of this set-up of preparing the heavy oil and compressed air, the burners will operate approximately 2 weeks before they have to be changed. The maintenance on these burners is very little and the time required to change a burner is about 30 seconds.

There are four furnaces for operation in the Maryland Glass plant:—

No. 1 Furnace: a side-port regenerative type, 12 ft. wide and 17 ft. 4" long (208 sq. ft. melting chamber), has three ports. 1st port 30" high x 36" wide (7½ sq. ft. area) which fires two #53 drilled burners (area 0.002780 sq. in. x 2) with a fuel input of 47.18%. 2nd port 30" high x 27" wide (5.62 sq. ft. area) which fires one #50 drilled burner (area 0.003848 sq. in.) with a fuel input of 32.65%. 3rd port 27" high x 24" wide (4½ sq. ft. area) which fires one #54 drilled burner (area 0.002377 sq. in.) with a fuel input of 20.17%. The oil pressure range is from 50 to 80#, with oil flow from 140 to 165 gallons per hour. The atomization air pressure is controlled at 24 pounds at the burner. This furnace melts and produces between 38 and 45 tons of Blue or Flint on approximately 5 sq. ft. per ton of glass pull. The checker volume is 4 times the sq. ft. melting area.

No. 2 Furnace: a side-port regenerative type, 16 ft. wide and 27½ ft. long (440 sq. ft. melting chamber) has four ports. 1st port 33" high x 36" wide (8¼ sq. ft. area) fires two #53 drilled burners (area 0.002780 sq. in. x 2) with a fuel input of 37.18%. 2nd port 33" high x 30" wide (6.9 sq. ft. area) fires one #50 drilled burner (area 0.003848 sq. in.) with a fuel input of 25.7%. 3rd port 30" high x 30" wide (6¼ sq. ft. area) fires one #52 drilled burner (area 0.003167 sq. in.) with a fuel input of 21.18%. 4th port 27" high x 24" wide (4½ sq. ft. area) fires one #54 drilled burner (area 0.002377 sq. in.) with a fuel input of 15.92%. The oil pressure range is from 50 to 80#, with oil flow from 180 to 215 gallons per hour. The atomization air pressure is controlled at 24 pounds at the burner. This furnace melts and produces between 85 to 92 tons of Blue glass on approximately 5 sq. ft. The checker volume is 5 times the sq. ft. melting area.



The last part of the heavy oil system where oil is controlled and measured before flowing to the burners.

Two electrical control pre-heaters for heavy bunker C fuel oil.

No. 3 Furnace: an end-port regenerative type 11 ft. wide x 18 ft. long (198 sq. ft. melting chamber) has two ports. Each port 30" high x 36" wide (7½ sq. ft. area) fires two #53 drilled burners (area 0.002780 sq. in. x 2). The oil pressure range is from 80 to 110# with oil flow from 120 to 150 gallons per hour. The atomization air pressure is controlled at 24 pounds at the burners. This furnace melts and produces between 38 and 42 tons of Blue or Flint on approximately 5 sq. ft. per ton. The checker volume is 3½ times the melting area.

No. 4 Furnace: a side-port regenerative type, 18 ft. wide and 26 ft. long (458 sq. ft. melting chamber) with a tapered bridge wall, has four ports. 1st port 36" high x 36" wide (9 sq. ft. area) which fires two #53 drilled burners (area 0.002780 sq. in. x 2) with a fuel input of 37.18%. 2nd port 36" high x 36" wide (9 sq. ft. area) which fires one #50 drilled burner (area 0.003848 sq. in.) with a fuel input of 25.7%. 3rd port 30" high x 30" wide (6¼ sq. ft. area) which fires one #52 drilled burner (area 0.003167 sq. in.) with a fuel input of 21.18%. 4th port 27" high x 24" wide (4½ sq. ft. area)

(*Continued on page* 342)

SALES PROMOTION MAJOR TOPIC AT G.C.M.I. MEETING

Howard C. Herger, President of the Pierce Glass Company and for the past year President of the Glass Container Manufacturers Institute, called to order the Ninth Annual Meeting of the Institute on Monday, May 18, at The Greenbrier in White Sulphur Springs, West Virginia.

At this time, Mr. Herger's term as Institute President expired and he is succeeded by J. M. Foster, President of Foster-Forbes Glass Company. Joseph M. Nester, President of Obear-Nester Glass Company, was elected 1st Vice President and Philip O'C. White, Secretary of White Cap Company, became 2nd Vice President.

John S. Algeo, Vice President and General Sales Manager of Hazel-Atlas Glass Company, was elected to the Board of Trustees. Re-elected to the Board were J. M. Foster, Joseph M. Nester, and Francis W. McDonald, Vice President and General Manager of Glass Containers, Inc.

In his opening remarks, Mr. Herger noted that this meeting of the G.C.M.I. was the largest to be held, since its first meeting eight years ago, with a total attendance of 260, including the ladies. In making mention of this, Mr. Herger observed that while numbers alone are not the best criterion of progress, he felt "this attendance and that at other recent meetings is a tribute to the foresight of the small committee which eight years ago was working diligently to bring G.C.M.I. into being and the 25 glass companies which in June of 1945 ratified and adopted the Articles of Incorporation and Code of Regulations."

Mr. Herger pointed out that at the Institute's first Annual Meeting in June 1945, there was a total of 48 member companies. Within a short time, the total enrollment grew to 73 concerns, plus the four larger glass container manufacturers who came in as contributing companies. These four manufacturers are now full-fledged members and membership continues at an even keel, enrollment now totaling 76. It is hoped that two rather substantial glass companies, which are not now members, together with a number of closure manufacturers and suppliers of various materials and equipment, will eventually appear on the roster of membership.

The capacity of the industry to produce through the eight years has increased approximately 27% and of this total less than half, or 11%, represented actual new melting area, while the balance, or 16%, came from improved efficiency. At the same time, shipments have increased 10% which, as brought out by Mr. Herger at the Fall Meeting, leaves the industry with an excess capacity based on the present level of volume of around 20%.

Before detailing Committee activities, Mr. Herger stated, "The achievements of the Institute and its nine standing committees and subcommittees is the matter we are most interested in and here I believe you must agree is a record to be proud of. These accomplishments, of course, would not have been possible without the fine cooperation of the technical and other representatives of the member companies who have served and are serving on a total of 23 committees." Mr. Herger was also lyrical in his praise of the fine performance of the Institute's staff, singling out Messrs. Hall, Kuni, and Cheney for special commendation.

J. M. Foster

In describing the accomplishments of the Institute and its nine Standing Committees, Mr. Herger first mentioned the Traffic Committee as traffic "was one of the earliest activities" undertaken by the industry. "Various rate cases, which this Committee has handled, represent an activity" measurable in a revenue sense. It was indicated, for example, "that the two glass container rate cases successfully adjudicated before the Interstate Commerce Commission in 1950 and 1953 respectively" resulted in substantial "annual savings in freight charges." "This Committee" participated "with the soda ash and sand producers in processing similar rate cases before the I.C.C. on these two raw materials. The soda ash case won in 1950 and the sand case just recently won represent further savings to the industry."

"The work of the Government-Industry Relations Committee has played a real part in the progress and welfare of the industry. We came through World War II and the post-war period with a minimum of hardship, our volume increased substantially, and we continue to benefit from the trend toward the use of stock containers which was brought about during that period. Similarly, the relations with the defense agencies during the recent emergency were handled with a minimum of dislocation and hardship to the industry. The work done by the Institute in arranging for an economic study of the glass container and closure industries, which was made available to O.P.S., was an effective contribution. Outside of the recent law passed by the State of Vermont prohibiting the sale of beer in One-Way bottles, there has been no major discriminatory legislation against the industry."

Turning to the matter of labor relations, Mr. Herger pointed out that since the industry bargains with two A.F.L. unions on an industry-wide basis, labor relations is one of our outstanding problems. The Institute furnishes labor relations counsel through Ralph A. Lind and finances the work of the Committee but, as such, takes no part in the actual bargaining. Mr. Lind, in elaborating on the labor situation later in the program, pointed out that from 1940 to the present time, wage rates of glass container employees have been increased approximately 113% and that in 1940 their average rates were higher than all manufacturing industry averages.

Mr. Lind further stated that in addition to the wage increases, many fringe benefits had been granted, including shift differentials, paid holidays, paid vacations up to three weeks, insurance and hospitalization, all of which amount to another 35% based on 1940 rates. All this in view of the fact that cost of living since 1941 is only up 84% and has declined in the last six months.

Mr. Lind went on to state that after talking with all glass container managements, there certainly is no justification for any further increases for glass company em-

ployees this year. Over-all glass container cost increases, of which labor is the largest increment, have seriously narrowed the profit margins of the manufacturers.

Mr. Lind said, "It is interesting to note that, according to figures published by the Bureau of National Affairs, there were 81 settlements in the first three months of this year in which no increases were given as compared to 52 last year in the same period of those companies that gave little or no increase last year. Settlements were made at a much lower average than the year before."

Mr. Lind concluded by stating it was the general opinion of the manufacturers that because of the extremely competitive conditions the industry cannot and must not increase its labor costs.

The glass container industry negotiates with its unions on a multi-employer basis, which is 99% industry-wide, and it was one of the first industries in America to accept unionism as a basis for bargaining, having bargained that way (for the last 60 or 65 years) since the 1870's.

In the technical field through its work with Preston Laboratories, the Institute's glass testing procedures have been expanded and refined, it was pointed out by Mr. Herger. Later, during the first day's session in a panel discussion, members had the opportunity of hearing the results of research work dealing with strength of glass containers and the effect of wall thickness, glass distribution, and service abrasions on the strength.

Similar technical work is being carried on dealing with problems of processing foods in glass containers. In 1948, for the first time, packers of low-acid foods in glass were furnished with Bulletin 30-L, a complete booklet giving processing times and temperatures and data on the necessary equipment and instrumentation. Through the work with the University of Massachusetts, continuous assistance is being given the glass container manufacturer's customer packing industries on various processing problems. The research work being done for the pickle and baby food packers has been particularly noteworthy. The status of the two extensive projects on aseptic canning in glass, the first of which was started three years ago, was given to the assembled members.

Basic work involving standards for finishes and glass containers has been carried forward and, in addition to new items, each year has brought refinements which improve manufacturing processes and make the product more attractive to the packer and ultimate consumer.

The G.C.M.I. Packaging Research Laboratory, established only six years ago, has become well-recognized by the Railroad Classification Committee, various government packaging committees, and numerous customer industries. It was pointed out by Mr. Herger that following the war, the Railroad Classification Committee proposed substantial increases in minimum packing requirements for glass as provided in Rule 41.

The work of this committee, in conjunction with the Traffic Committee, proved to the Railroad Classification Committee that higher packing requirements were needed in very few instances and that in other instances the requirements could be reduced. Surveys conducted by this Committee dealing with the transportation of glass packed products have been effective in preventing still higher freight rates on customer's products. The research work on boxes, and particularly on interior packing, will provide protection against more costly packaging in the future.

Subcommittees of the West Coast members of the Institute have collaborated on virtually all of the above activities, and G.C.M.I.'s West Coast office makes that group a definite functioning part of the Institute.

The most recent activity of the Institute's Packaging Research Laboratory has been a study of bottled wine shipments which was inaugurated in August 1952. Bottled wine was selected for special study as it moves transcontinentally in large volume. This project has been carried out in cooperation with the Wine Institute.

The results of this investigation, soon to be released in a brochure entitled "Methods for Carloading Bottled Wine," are based on the evaluation by the G.C.M.I. Packaging Research Laboratory of present packages and the inspection at shipping point, as well as destination, of hundreds of carloads of bottled wine.

It is expected that the information and carloading recommendations included therein will be of material assistance, not only to the glass container and wine industries, but also to carriers, box manufacturers, and packers and shippers of other products in glass.

Upon publication, copies of this brochure can be obtained from the Glass Container Manufacturers Institute or the Wine Institute, and it is planned that this important study will be extensively summarized in the July issue of THE GLASS PACKER.

Turning attention to the marketing and promotion of glass containers, Mr. Herger was most emphatic in pointing out that the industry as a whole could do a much better job of selling the advantages of glass as a packaging material.

Analyzing the components of the industry from a standpoint of the number, size, and sales volume of the various companies, Mr. Herger stated that it would seem that its make-up lends itself to an industry program of sales promotion. Mr. Herger also emphasized the increasing competition from materials other than glass in markets which have been considered traditional glass strongholds for a long time.

In summing up his appeal for a real effort in the market development and merchandising of glass containers, Mr. Herger said, "The important point to my mind is that a greater effort should be put forth and if it cannot be done on an industry basis, then as individuals we must get busy and do as effective a job as possible."

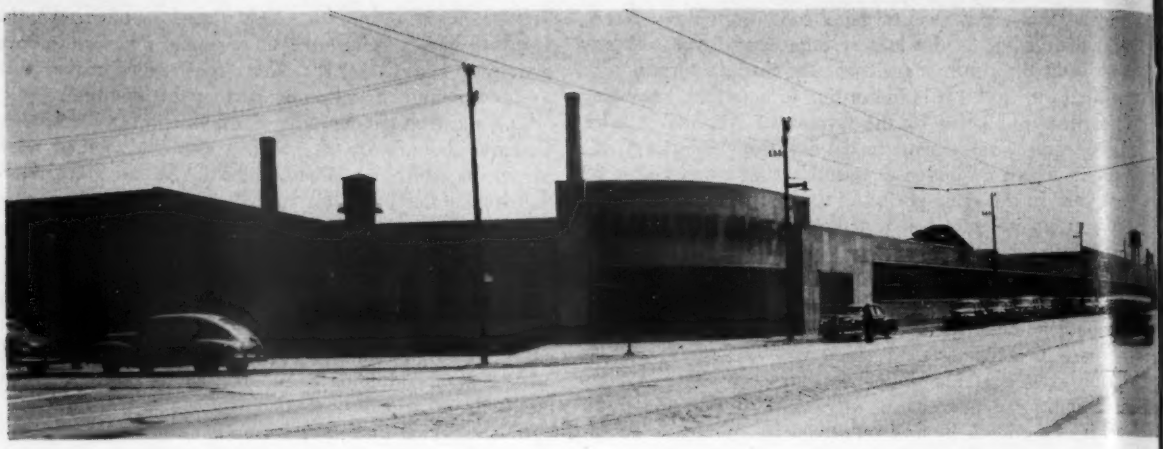
Guest speaker on the last day of the three-day meeting was Ralph W. Carney, formerly Vice President in charge of Marketing of The Coleman Company, Wichita, Kansas. His topic, "Selling to Defend America." Mr. Carney's talk was not only inspirational and stimulating, but was studded with practical selling philosophy.

Despite its sales problems, the glass container industry looks forward to a high level of business in 1953. In this connection, C. C. Merrifield, Vice President of The Econometric Institute, Inc., predicted that shipments of glass containers would equal 116,000,000 gross, which was the industry's all-time high attained in 1946.

On the social side, the meeting was as usual highly successful, enhanced as it was by the large attendance.

Golfers turned out in force and there was keen competition for an attractive array of prizes which were contributed by the member companies.

It was announced that the Fall Semi-Annual Meeting will be held at the Sago Mar Hotel, Fort Lauderdale, Florida, December 1, 2, and 3.



TEMPERATURE CONTROL IN MIRROR MAKING

Producing a high quality mirror depends a great deal upon careful control of the silvering process. At the Hamilton Glass Company of Chicago, Illinois, the most important variable in their silvering process is accurate temperature control in the factory area.

Hamilton makes mirrors by the process of precipitation of silver upon the flat surface of the plate glass. Temperatures must be constant and accurately controlled in the factory area where this process is performed, since the degree of precipitation depends in a large part upon the room temperature. Too high a temperature would cause excessive, costly thicknesses of silver to be deposited, while too low a temperature would result in too thin a silver coating or would slow up the process greatly.

Because of this close relationship between the room temperature and the success and economy of the mirror silvering process, the heating system in the Hamilton Glass Company's new single-story plant had to be one which could be depended upon to keep the temperature at a constant 75°F., the optimum temperature for the silvering process. To do the job, engineers designed a heating system consisting entirely of unit heaters, using both horizontal and vertical delivery models. Vertical delivery unit heaters send heat down from the ceiling top to the floor level where it is needed. Horizontal delivery heaters offset cold drafts along the outer walls, which, appropriately, make extensive use of glass.

The unit heaters are eminently well-suited to handle this dual job of not only heating the factory, but controlling the temperature factor in the silvering process. They heat rapidly from a cold start and are designed for a quick response to demands made by sudden changes in the outside temperatures, easily maintaining the desired temperature levels.

Economy of Operation

The use of unit heaters as the new plant's heating system is proving economical from a number of standpoints. By stabilizing the temperature conditions, the unit heaters insure the most economical operation of the silvering process. In addition, a heating system composed of unit heaters makes for economy in fuel consumption. Because the unit heaters direct heat precisely where it is needed, such as along the long expanses of glass in the outer walls of the building, heat loss is reduced. Less heat loss means less fuel used to gain the desired temperature levels.

The Hamilton Glass Company can look forward to

(*Continued on page* 338)

Vertical unit heaters installed on the ceiling of the room, where the plate glass for mirrors is stored, send heat right down to the floor level where it is needed. The heaters are out of the way of equipment and leave all of the valuable floor space available for storage purposes.

Attractive use of glass appropriately keynotes the lobby of the Hamilton plant.

Shown above is a corner section of "TwindoWeld," reported to be the first all-glass insulating unit.

PPG INTRODUCES ALL-GLASS INSULATING WINDOW

The Pittsburgh Plate Glass Company has made announcement that it is beginning to manufacture the first all-glass double-glazed insulating window, edges of which are electrically fused to provide a glass-to-glass seal having no metals, bonding materials, or other assembled parts in its construction. To be known as "TwindoWeld," the new product also eliminates edge conductivity, making it particularly desirable for refrigeration and air-conditioning applications.

TwindoWeld consists of two layers of eighth-inch thick glass separated by a three-sixteenths inch air space. The air between the two panes of glass is removed in the manufacturing process and replaced with especially dried air. Internal air pressures are adjusted to enable the insulating units to withstand atmospheric pressure in all parts of the United States having altitudes under 3,000 feet.

The new insulating glass is as simple to install as a single thickness of glass. Test panels exposed for a five-year period under varying atmospheric conditions at Billings, Montana, Jacksonville, Florida, Burlington, Vermont, and Newark, New Jersey, have all provided excellent service with no reported failures in any of the test installations.

Heat transfer properties of TwindoWeld are the same as for the assembled insulating windows now being manufactured. Under average conditions, the new units will reduce the amount of heat transfer by about one-half of the normal amount transferred through an equivalent area of conventional single-glazed windows. TwindoWeld also reduces condensation problems, offering greater see-ability by reducing the tendency for room-side glass fogging during the winter months.

Pittsburgh Plate Glass Company has purchased and is now operating a plant for limited production of TwindoWeld at Lincoln, Illinois. The new unit is expected to retail at about the same price as the assembled double-glazed insulating windows now available, but there are indications that large volume production may result in lowered costs.

L-O-F ELECTS JOHN BIGGERS BOARD CHAIRMAN; G. P. MacNICHOL PRESIDENT

Tribute to John D. Biggers, new Chairman of the Board and chief executive officer of Libbey-Owens-Ford Glass Company, was paid by the Board of Directors of the company at their organization meeting following the annual shareholders' meeting. His continued service as Chairman, along with G. P. MacNichol, Jr., new President, will insure the extension of their executive teamwork, while giving Mr. MacNichol much broader responsibilities in the general operation of the company.

Mr. Biggers served as President for 23 years and during that period the company has experienced exceptional and steady growth. During the tenure of Mr. Biggers as President and Mr. MacNichol as Vice President in charge of Sales, the company grew from 2,344 employees in 1930 to 11,488 at the close of 1952, increased sales from $13,402,599 in 1930 to $166,442,764 last year, and its total assets have increased from $42,515,157 in 1930 to $116,822,894 in 1952. During this 23-year period, Libbey-Owens-Ford has paid to its employees in wages, salaries, and benefits a total of $530,237,863 and distributed to its shareholders a total of $142,952,633 in dividends.

Mr. Biggers' consent to forego the retirement which would be open to him under the L-O-F retirement plan next December, came as a result of the unanimous request of the directors, but was on the condition that his continuance in active relation with the company would not defer the promotion of younger men in the organization in keeping with the spirit of the retirement plan.

WALSH REFRACTORIES ELECTS P. L. HERSHFIELD AS PRESIDENT

Paul L. Hershfield, President of the Mississippi Glass Company, has also been elected President of the Walsh Refractories Corporation, replacing J. L. Crawford, who has resigned. Mr. Hershfield continues as Chairman of the Board of the Walsh company, an office he has occupied for several years.

A. J. Tomasek, formerly Chief Engineer, has been promoted to the office of Executive Vice President of Walsh. John J. Duggan has been promoted to Sales Manager of Glass Refractories, and W. K. Schweickhardt, formerly District Sales Manager of the Chicago Office, has been promoted to Sales Manager, General Refractories, with headquarters at St. Louis. Thomas W. Gill has been re-elected Secretary and Treasurer.

• Joseph Kunz, a 1950 graduate in physics of the University of Rochester, has joined the Glass Physics Section of the Chemical Research Laboratory of Bausch & Lomb Optical Company to take charge of fundamental investigations of glass-to-glass fusion problems.

Inventions and Inventors

Annealing and Tempering

Bending Mold for Sheet Glass. Fig. 1. Patent No. 2,633,673. Filed April 26, 1951. Issued April 7, 1953. Two sheets of drawings. Assigned to Libbey-Owens-Ford Glass Company by William P. Bamford and Joseph E. Jendrisak.

An improved bending mold is shown in Fig. 1 of the outline or ring type wherein the supporting or shaping surface is around the lower margin of the plate or sheet. In practice, the sections 12 and 13 of the mold 10 are raised by pivoting the same on the hinges 14 and since in a simultaneous action the over-all length of the sections will be increased, the links 15 will be swung outwardly or out of plumb to compensate for such lengthening of the mold. In moving from the closed position to the open position shown, the end areas of the mold sections are separated sufficiently to receive a flat sheet of glass therebetween. For locating the sheet and employing the same to initially restrain the mold in its open position, the mold sections are equipped with locator devices 48 which will locate the ends of the glass sheet equally from the ends of the mold sections and bear the thrust of the mold as it endeavors to move by gravity to its closed position against the rigidity of the glass sheet while flat. In order to center a sheet of glass transversely on the mold 10, the sections may also be provided with locating devices 49.

As the mold is carried through a suitable furnace and the glass properly softened, the out-of plumb positions of the links 15 will tend to the aid of gravity to urge the mold sections inwardly and downwardly to their closed positions. The molds are so designed as to permit the bent glass sheet to be carried through a tempering area in which blasts of cooling air are directed against the upper and lower surfaces of the hot glass.

The patent contains eight claims and the reference cited was: 2,057,763, Boyles et al., Oct. 20, 1936.

Feeding and Forming

Sealing Glass Ampuls. Fig. 2. Patent No. 2,633,672. Filed April 13, 1950. Issued April 7, 1953. 11 sheets of drawings. John D. Ralston.

The apparatus, a portion of which is shown in Fig. 2, comprises a series of moving cups 11 that carry each ampul through a series of spinning and pulling operations.

Each cup 11 is adapted to receive an ampul A, such as of the type having a lower or main body section 17 in which the medicinal or pharmaceutical, or other material, is contained, and directly above a neck 18 which is adapted to be broken to obtain access to the contents of the ampul. A bulge above the neck 18 is adapted to be grasped by the user in breaking the neck 18, while an

Fig. 1.

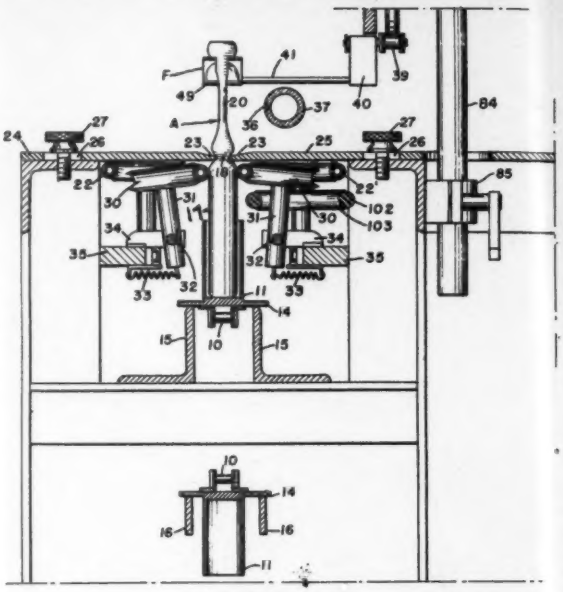


Fig. 2.

upper neck or elongated sealing section 20, of reduced cross-sectional area, is adapted to be heated for severing and simultaneously sealing. Above the sealing section 20 is an enlarged top, which may be used as a guide in filling and also may be engaged by a finger of the pull assembly.

The spinning section includes a pair of endless belts 22 and 22′ which may be formed of rubber tubing or the like, and more preferably disposed in a horizontal plane, to engage the ampuls A on opposite sides during traverse of the inner portion of the paths thereof. Belts 22 and 22′ are moved in the same direction, so that movement along the inner paths will be in opposite directions to more effectively spin each ampul A while in a cup 11.

As each ampul A travels along the spinning section, the elongated sealing section 20 is heated, as by a series of heating gas flames discharged from orifices 36 in a flame pipe 37, for ultimate severing. The complete operation of the machine can only be understood after a study of the numerous drawings.

The patent contains 20 claims and the 12 references were cited.

Take-out Device for Glass Blowing Machine. Fig. 3. Patent No. 2,634,552. Filed January 10, 1949. Issued April 14, 1953. Two sheets of drawings. Assigned to the Fairmount Glass Work, Inc., by John L. Woolling.

The transfer mechanism shown in Fig. 3 comprises a vertical shaft 20 rotatably supported at one side of the mold table from upper and lower arms 21 and 22 which project outwardly from the frame of the machine. Intermediate in its length, the shaft 20 has secured to it a spider 23 having at least three, and preferably four, arms, each of which supports at its outer end a bottle-carrying head designated generally by the reference numeral 24. Each of such heads comprises a bottle-clamp 25 adapted to grip the neck of a bottle 26. Each cylinder 27 is arranged vertically, and the piston 28 moves upwardly to

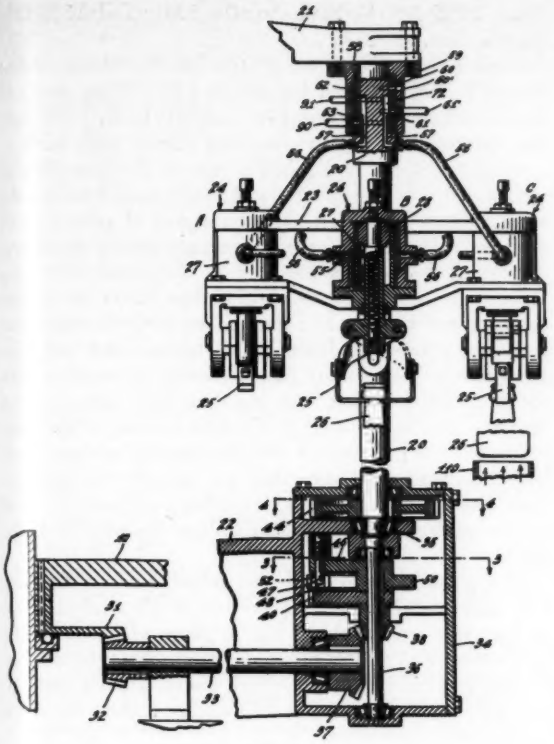


Fig. 3.

close the clamp 25 and downwardly to open it. The shaft 20 is operated jointly with the mold table 10 so as to rotate intermittently and bring the several heads 24 successively into association with the mold table at the take-out station.

The patent contains five claims and 13 references were cited.

Furnaces

Process for Melting Glass. Fig. 4. Patent No. 2,634,555. Filed July 17, 1947. Issued April 14, 1953. One sheet of drawings. Assigned one-third to Union des Verreries Mecaniques Belges by Georges Henry and Edgard Brichard.

A vertical shaft furnace is proposed to melt glass as shown in Fig. 4. Raw materials are charged into the furnace with the aid of a worm gear and an air pressure tube i. Above the constriction d, the oven flares upwardly so that the rate of flow of the fumes decreases as they rise, and opposite the fumes outlet it is so low that no part of the raw materials is carried towards the recuperators.

As they come out of the oven, the fumes enter a recuperator j in which their pressure and rate of flow are still sufficiently great to ensure an efficient heat exchange with the comburent air. They are then expanded in a gas turbine k which drives the air blower m and gas blower l.

The comburent air compressed by the turboblower m successively passes through the recuperators n and j, and arrives at high temperature in the air chamber for the nozzles c. The fuel gas compressed by the turboblower l is sent to the gas chamber for the nozzles c. The glass melted in the oven passes under a wall p into

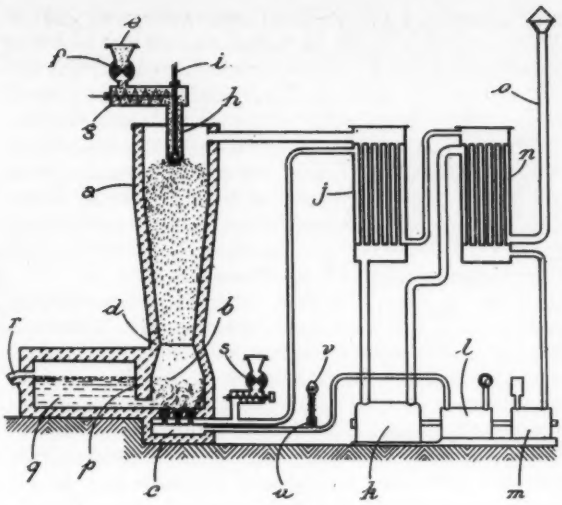


Fig. 4.

a rest zone q where it is collected at r or directed towards shaping or other apparatus.

The pressure and rate of speed of the flames, combined with the efficiency of the heat transmission in the turbulent mass, make it possible to develop within a restricted space a very large quantity of heat and thus melt rapidly and efficiently.

The patent contains 11 claims and 11 references were cited.

Fining of Glass by High-Frequency Vibration. Fig. 5. Patent No. 2,635,388. Filed August 6, 1947. Issued April 21, 1953. Two sheets of drawings. Assigned to Societe Anonyme des Manufactures des Glaces et Produits Chimiques de Saint-Gobain by Ivan Peyches and Edouard Virgile Borel.

The process is accomplished by subjecting localized and limited volumes of the glass with bath simultaneously to high heat and to vibration by sound waves in the audible or ultrasonic ranges. The apparatus objects are attained by causing a heater immersed in the bath to vibrate with the periodicity required to produce vibrations of high frequency. By high frequency is meant a frequency of at least 1,000 cycles per second and preferably between 10,000 and 20,000 cycles per second. There is thus produced in the glass bath in small zones close to the heater elements a sharp rise in temperature and an intense vibration.

Because of the existence of the hot point established in the mass of glass by the heater element, there is estab-

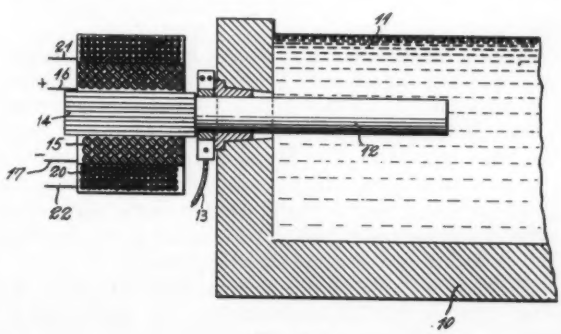


Fig. 5.

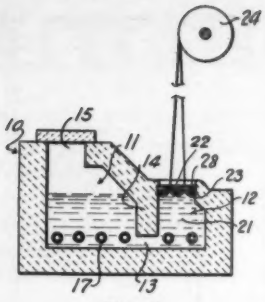


Fig. 6.

lished in the mass convection currents that take their origin from this point and entrain a constant circulation of the glass past this point, so that practically, at the end of a certain period of time, the whole of the glass in the bath is found to have been passed through this active zone.

"In the construction as shown in Fig. 5 the numeral 10 indicates, diagrammatically, the furnace tank in which glass 11 is held. An electrode 12, supplied with current useful to heat the bath by lead 13, enters the furnace horizontally through the sidewall. On the end of the electrode is applied a vibrating member of a high-frequency vibration generating apparatus of a suitable type, for example a magneto-strictive generating apparatus. This apparatus consists essentially, as is known, of a core formed of superposed sheets of magneto-strictive metal or alloy. About this core are two concentric coils 15, 20 of which the inner is served with direct current by leads 16-17 and the outer with high frequency alternating current by leads 21-22. The direct current winding establishes a constant magnetic field while the other carries an alternating field which is superimposed on the direct field and produces the vibration of the core and the electrode on which it is acting."

The patent contains 18 claims and 16 references were cited.

Glass Wool and Fiber

Glass Fiber Production. Fig. 6. Patent No. 2,634,553. Filed December 14, 1945. Issued April 14, 1953. Two sheets of drawings. Assigned to Owens-Corning Fiberglas Corporation by Robert G. Russell.

A novel way of drawing glass fibers is proposed. A pick or other pointed metallic instrument to which glass will adhere is immersed in a pool of glass and the fibers or filaments are drawn upward. The process is illustrated in Fig. 6.

A glass melting tank 10 composed of refractory material consists of a melting chamber 11 and a refining and delivery chamber 12 connected at the bottom by a channel 13 formed in a bridgewall 14. Material to be melted, such as glass forming batch, is supplied to the melting chamber 11 through a charging opening 15 at the top of the melting chamber. The opening 15 also serves as an exhaust port for gases evolved during melting of the batch.

Heat is supplied to the chambers 11 and 12 by means of electrically heated coils 17 of tungsten, molybdenum, and platinum. The filaments may be started by inserting a pick or starting wire in the openings 23 and drawing the glass upwardly. The fibers may then be wound as a strand on a spool 24. By drawing the fibers upward and providing proper heat distribution in the attenuating zone, the fibers are less likely to chill and freeze as often happens when a downward draw is practiced.

The patent contains nine claims and the references cited were. 1,796,571, Mathieu, Mar. 17, 1931; 2,194,814, Stewart, Mar. 26, 1940; 2,225,667, Staelin, Dec. 24, 1940; 2,229,489, Barnard, Jan. 21, 1941; and 2,335,135, Staelin, Nov. 23, 1943.

Glass Fibers Treatment. Patent No. 2,624,658. Filed August 8, 1949. Issued January 6, 1953. Eight sheets of drawings (none reproduced). Assigned to H. I. Thompson Company by Leon Parker and Bonnie Jean Zack.

Glass fibers may be leached to remove the non-siliceous oxides and thus produce fibers of high silica content, the silica content depending upon the degree of extraction of the fibers. Depending upon the composition of the fibers, these non-siliceous oxides may be extracted either by plain water or with acids. While glass fibers of various compositions may be so extracted by both neutral water and acid waters, the borosilicate glasses which are usually employed in forming glass filaments for weaving into textile materials which have less than 70% silica content may be extracted without previous preheating of the glass structure. Such filaments may be leached without such heat treatment and since they are usually of less than .001" in diameter, they may be leached to remove the acid soluble oxides other than silica without destruction of the fiber.

The glasses which lend themselves best to drawing into fiber contain about 56% or less of silica, about 22% or less of alumina, about 5% or more of boron oxide, and about 22% or less of second group metal oxides, especially lime and magnesia. Such fibers, without preheating, may be readily leached with acid to remove the metal oxides other than silica.

The resultant product contains some water of hydration and may be dehydrated by heating to temperatures, preferably in the region of about 1,400° to 1,600°F. By proper control of the acid extraction process, the resultant fibers after firing contain high silica content and may be as high as 90% and even substantially 99.9% of silica.

The patent contains 15 claims and the references cited were as follows: 2,184,320, Simpson, Dec. 26, 1939; 2,315,259, Hyde, Mar. 30, 1943; 2,407,483, Ebaugh, Sept. 10, 1946; 2,461,841, Nordberg, Feb. 15, 1949; and Refrasil, Reprint, from vol. 44, No. 12, Dec. 1948, issue of *Chemical Engineering Progress* (6 pages).

Miscellaneous Processes

Pick-up Tube for Television. Patent No. 2,619,531. Filed September 14, 1949. Issued November 25, 1952. One sheet of drawings, none reproduced. Assigned to Pye Limited by Donald Weighton.

This invention relates to a pick-up tube for television in which the scene to be televised is focused on to a photo cathode, the electrons omitted from which are guided by the magnetic field of the surrounding coil on to a corresponding point of a target of mosaic electrode.

It consists of a pick-up tube of the type referred to in which the geometrical distortions due to the magnetic field of the focus coil and the deflecting coils are eliminated. The beam for scanning the target to produce the picture signals in the output circuits connected to the signal plate associated with the target and corresponding to the picture being televised is generated by causing a flying spot of light to scan the photo cathode of the tube. In this way the scanning beam generated on the photo cathode by the flying spot of light is directed on to the target by the same focus coil as directs the electrons released from the photo cathode.

The details of the invention are best understood by re-

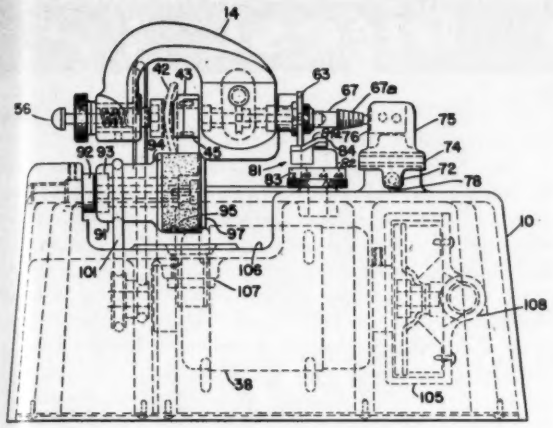


Fig. 7.

ferring to the detailed drawings. The patent contains four claims and 10 references were cited.

Lens Grinder. Fig. 7. Patent No. 2,617,236. Filed June 16, 1949. Issued November 11, 1952. Assigned to Univis Lens Company by Robert E. Allen and William F. Utzinger.

An improved method of grinding and edging optical lens blanks is shown in Fig. 7. The machine involves a lens blank holding element 43, an abrading element 95 for grinding the edge of the lens blank, pattern means for determining the peripheral shape of the lens blank, means for controlling the movement of these members in a predetermined manner, and means for driving the machine.

The abrading element for the lens blank comprises, in general, a quill housing 91 having a centrally positioned spindle shaft 92. This shaft is secured at one end within the upper part of the base 10. The quill housing 91 is supported at each end on bearings 93 mounted on the shaft 92. This quill housing 91 thus rotates freely. The quill housing 91 is enlarged to provide a drum portion 94 which is encircled by a removable abrasive belt 95. If desired, a diamond wheel of the same size can be substituted for the drum 94 and belt 95.

A groove is formed in the opposite end of the quill housing 91 to receive a belt 101. This belt is directly driven from the motor 38 and rotates the drum at a rate of speed of the order of 5000 R.P.M. The shaft means for driving the holder provides for rotating the lens blank in a direction opposite to the direction of rotation of the drum 94 and at a rate of speed of the order of 2 R.P.M. Then when the edge of the lens blank 42 comes into contact with the abrasive surface of the belt 95, a cutting engagement is obtained.

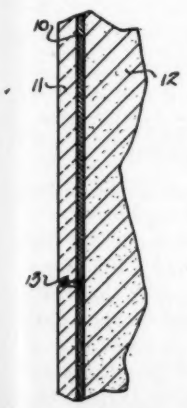


Fig. 8.

A suction pump 105 is also driven from the motor 38. A recessed area 106 is provided in the top of the base beneath the drum 94 to receive the cuttings and dust from the grinding operations. These cuttings are removed through an opening in the surface 106 which connects with an adapter 107. A hose, not shown, connects between the adapter and the suction inlet 108 of the pump.

The patent contains eight claims and the following references were cited: 375,332, Besson et al., Dec. 27, 1887; 1,455,863, Bugbee, May 22, 1923; 1,457,855, Richardson, June 5, 1923; 1,558,167, Herrick, Oct. 24, 1925; 1,713,622, Rakel, May 21, 1929; 2,164,155, Lemay, June 27, 1939; and 2,321,383, Harper, June 8, 1943.

Structural Glass. Fig. 8. Patent No. 2,618,959. Filed April 24, 1948. Issued November 25, 1952. One sheet of drawings. Assigned to Libbey-Owens-Ford Glass Company by George B. Watkins.

Special adhesives have been developed to satisfactorily and permanently mount structural panels to walls and other surfaces. Difficulty in mounting such panels are due largely to the large weight and extensive area involved in their support. Best results have been obtained by the use of a cold setting "Thiokol" base, synthetic resin. To this is added carbon black and other waxes to give it body. Further compounding with a Bakelite type resin produces the desired adhesive properties.

For example, a mixture of from 55% to 60% of polyfunctional mercaptan, 10% to 15% of liquid phenol formaldehyde, and approximately 30% carbon black gives a mix of this generally desirable consistency.

In facing walls with glass slabs as shown in Fig. 8 of the drawings, for instance, a batch of the compound after being properly mixed with the accelerator is applied in a relatively thin uniform coating 10 to the back of a structural glass slab 11, and the backed or coated side of the slab is then pressed into place against the wall 12 to be faced. The special adhesive backing material adheres tightly to plaster, masonry, or practically any other kind of wall surface, and no preparatory work need be done on the wall prior to the application of the glass facing.

Additional methods of mounting are illustrated by various drawings. The patent contains 10 claims and the references cited were as follows: 2,206,643, Patrick, July 2, 1940; 2,394,375, Gross, Feb. 5, 1946; 2,466,963, Patrick et al., Apr. 12, 1949; 466,159, Great Britain, May 13, 1937; and 48,977, France, June 28, 1938. (1st addition to 804,552)

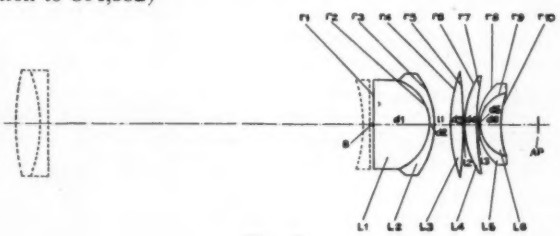


Fig. 9.

Optical Eyepiece. Fig. 9. Patent No. 2,621,564. Filed September 7, 1950. Issued December 16, 1952. One sheet of drawings. Ludwig Jakob Bertele.

This invention is concerned with the eyepieces of optical instruments for viewing real images produced by an objective. The accompanying drawing shows the optical sequence of the eyepiece in accordance with the invention: L denotes the individual lenses; r, the radii of curvature of the lense surfaces; d, the lens thicknesses; l, the air spaces between the individual lenses; n, the refractive indices; and v, the Abbé numbers.

The suffix denotes the order in which each of the above occurs from the objective towards the eye. AP is the

(*Continued on page* 330)

Some Factors Affecting the Testing of Surface Durability of Flat Glass

The estimate of the durability of glass is actually a measure of the rate of attack of the corroding agent under the specific conditions of the test. Rates of chemical reactions at surfaces are most difficult to study and have been the subject of many investigations. Recently a new test for evaluating the surface durability of flat glass by measuring the "haze" developed has been evolved. In this test, water vapor alternately condenses and evaporates on the surface of the sample owing to a deliberate and automatic changing of the temperature of the test chamber on a 2-hour time cycle a few degrees above and below saturation at 55°C. Use, therefore, is made of the important factors that contribute to the staining and deterioration of glass surfaces; namely, alternate fogging (condensation of moisture) and drying (clearing) of the surface. The products of weathering are not removed but remain in place on the surface being tested.

H. E. Simpson, in the April 1953 *Journal of the American Ceramic Society*, reports on the effect of various factors on the results of testing by this "haze" method. Among the various factors studied were: the effect of previous history of the sample, including aging; the effect of surface treatment involving grinding and polishing; and the effect of chemical treatment with acids and alkalis. The results of this study are condensed below.

The resistance of the surface to attack by moisture changes progressively after manufacture. Only a small amount of haze (about 20%) develops after 55 days of exposure if the sample is tested directly after manufacture. The resistance to hazing, however, changes with time. The alteration may be due to the effect of adsorbed moisture on the newly-formed or virgin fire-polished surface. This alteration proceeds progressively for the first three months, providing reasonably dry storage is maintained. On the other hand, if high humidity and poor storage conditions are provided, the alteration is accelerated. The glass changes quite rapidly for the first month of poor storage, but subsequently there is little alteration. The same is true if the glass is stored under distilled water. The glass changes quite rapidly within one month, but there is little change thereafter, even after one year of storage under water.

There appears to be a maximum breakdown or limit beyond which the glass will not go. This limit represents about 70 to 75% haze that will develop within 55 days exposure. The rate at which this upper limit is attained depends on the storage before testing. If the storage conditions are dry and ideal, the rate of deterioration will be slower than if the storage conditions are poor. It is also interesting to note that glass stored under water for one year does not break down or exceed the upper limit of deterioration indicated above. As long as the glass is kept totally submerged, little deterioration of the surface seems to occur.

Grinding and polishing the original fire-polished surface of window glass seems to reduce its durability. The fire-polished surface develops approximately 50% haze in 55 days of exposure, whereas the same glass ground and polished develops about 75% haze in the same time. This characteristic is true regardless of whether the glass was acid-washed or water-washed after forming.

The results of the acid and alkali investigation seem to indicate that the sulfuric acid treatment delays the surface deterioration of the glass and thus provides more resistance to attack by moisture. It is also possible that the surface is actually depleted in alkali and thus becomes more siliceous, and, as Weyl has said, the Si-O-Si bond remains unbroken at the surface. The sulfuric acid treatment also seems to develop a protective film or barrier that is ultimately broken or penetrated. This barrier does deter the action of water, so resistance of the surface to attack by moisture is increased.

When the glass surface is treated with sodium hydroxide, a film of alkali is formed that seems to hasten the breakdown or attack by moisture. It is probable that the sodium hydroxide film deposited merely facilitates and hastens the formation of an alkali film usually formed after the initial sodium silicate extraction. Alkalis are known to attack industrial glasses rather readily, and this treatment seems to confirm previous experience.

The hydrochloric acid treatment does not give the same result as the sulfuric acid treatment. Any acid films remaining on the surface of the glass apparently tend to neutralize or delay the action of alkaline solutions. It may be that hydrochloric acid has a severe initial effect on the glass surface and actually etches the surface, providing a weakened surface that is more vulnerable to subsequent attack by moisture.

It is also quite probable that the hydrochloric acid, being more volatile than sulfuric acid, is more completely removed because the samples were dried by an air blast. This means that little acid film remains and sulfuric acid, on the other hand, being less volatile, remains as a strong barrier (film) and not only neutralizes any alkali formed, but takes up the adsorbed water film as well.

The sulfuric acid treatment is much more beneficial than either the hydrochloric acid or the alkaline treatment.

From the results of this investigation, it was concluded that (1) the surface durability of glass is influenced by the past history of the material to be tested, (2) the conditions of storage and time of storage are important, (3) the type of surface produced, such as fire-polished and ground and polished, also affects the durability, (4) when the surface durabilities of various glasses are to be compared, these factors should be controlled.

STEUBEN VICE PRESIDENT DIES AFTER LONG ILLNESS

Joseph B. Tredennick, Vice President of Steuben Glass, Inc., died at the age of 46 following a long illness.

Born in Brooklyn, Mr. Tredennick was graduated from the Hotchkiss School in 1927 and received a B.S. degree from Princeton in 1931. After working with the Northeastern Construction Company, he joined Steuben Glass in 1938. He became successively manager of sales, assistant to the president, and director of advertising and promotion. He was named Vice President in 1950 and Director of Sales the following year.

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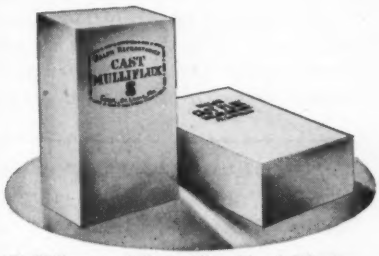
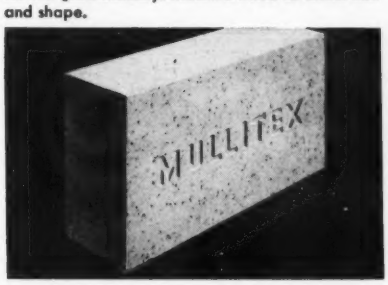
with WALSH MISSOURI-QUALITY REFRACTORIES

Meeting today's demands for greater production at lower cost calls for refractories that yield maximum service and economy. Each time-tested Walsh product is a supreme achievement—the result of unique properties, advanced methods of manufacture and better research and ceramic engineering—a combination that sets new standards for long life and dependability. These factors mean longer furnace lining life with less down-time for repairs, reduced manufacturing costs and, consequently, *more for your money.*



Mulliflux and Cast-Flux Tank Blocks—Greater density, more uniform expansion and superior resistance to high temperatures and corrosion characterize Walsh vacuum cast tank blocks for the glass industry. Machine-trued to exact size and shape.



Mullitex Fire Brick—Super duty. Dry press process. Tunnel kiln burned.

Mullitex HB (High Burn) special super duty. (D.P.) Tunnel kiln burned. 100% Missouri clays.

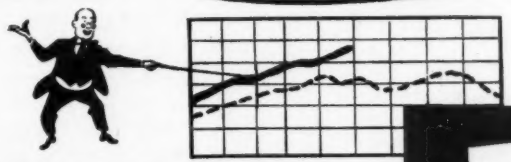
CSR—For safer, longer lasting protection in glass tank upperstructures.

CSR (Fortified). For extra life in upperstructures "tough spots". P .C. E. Cone 39 (3389 deg. F.)

Feeder Parts—Use WALSH (Vacuum-Cast) Channels, Spouts, Tubes, Plungers, and other Forehearth Shapes for longer life, better quality glass, and complete service satisfaction.

WHAT'S YOUR PROBLEM?

If you have an unusual refractory problem, if you have difficulty in reaching and maintaining desired service life, if you have *any* refractory problem at all, it will pay you to investigate the outstanding properties of Walsh Refractories. Your inquiries are invited. No obligation, of course.



PROGRESS REPORT

What Walsh Is Doing To Increase Refractory Production

Completion this year of a large, new tunnel kiln at our Vandalia, Missouri works will help meet the great and growing demand for quality fire clay refractories needed both for defense and civilian requirements. This project is another example of . . . progress at Walsh . . . for over 50 years manufacturers of high grade refractories.

WALSH ALSO MAKES:

High Heat Duty Fire Brick Plastic Furnace Lining • High Temperature Cements • Air Setting Castables • Insulating Cements • Plastic Ramming Mix • Wall Coatings • Special Shapes . . . and a complete line of Refractories for the Glass Industry.

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FOR OVER 50 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

Current Statistical Position of Glass

Glass container production, based on figures released by the Bureau of Census, dropped during April to reach 10,290,720 gross. This is 3.7 per cent less than the 10,696,973 gross produced during March. Production during April 1952 was 9,523,038 gross, which is 8 per cent less than during April this year. At the end of the January-April 1953 period, production of glass containers has reached a total of 39,280,571 gross. This is 7.1 per cent higher than the 36,646,264 gross produced during the corresponding period in 1952.

Shipments of glass containers during April were 9,442,688 gross. This is 23.1 per cent below the 12,292,685 gross shipped during March, an all-time high for a single month. During April 1952, shipments of glass containers were 9,838,327 gross, or 4 per cent over April this year. Total shipments thus far in 1953 have reached 39,242,892 gross. During the same period in 1952, shipments were 35,992,674 gross, or 9 per cent less than for 1953.

Stocks on hand at the close of April 1953 were 9,740,640 gross, which is 7.5 per cent more than the 9,055,924 gross on hand at the end of March and 1.2 per cent less than the 9,862,648 gross on hand at the end of April 1952.

Automatic tumbler production during March 1953 was 6,777,783 dozens. This is 6.1 per cent above the 6,387,101 dozens produced during February. Production during March 1952 was 5,357,141 dozens. Shipments during March 1953 also rose and were 5,907,810 dozens. This is 6.6 per cent over the 5,540,919 dozens shipped during February. March 1952 shipments were 5,060,875 dozens. Stocks on hand at the close of March 1953 were 10,230,080 dozens, which is 6.9 per cent more than the 9,565,934 dozens on hand at the end of February. Stocks at the end of March 1952 were 10,241,087 dozens.

Table, kitchen, and household glassware: Manufacturers' sales of machine-made table, kitchen, and household glassware during March 1953 were 3,667,047 dozens. This is .3 per cent over the 3,655,728 dozens sold during February. March 1952 sales were 3,448,700 dozens. At the end of the 12-month period ending March 1953, manufacturers have sold a total of 41,800,897 dozens. Compared with the 38,420,714 dozens sold during the corresponding period ending March 1952, an increase of 8.7 per cent is shown.

GLASS CONTAINER SHIPMENTS

(All Figures in Gross)

Narrow Neck Containers	April, 1953
Foods	1,005,983
Medicinal & Health Supplies	929,149
Chemicals, Household & Industrial	786,733
Beverages, Returnable	852,542
Beverages, Non-returnable	180,616
Beer, Returnable	248,117
Beer, Non-returnable	718,778
Liquors	630,551
Wines	274,974
Toiletries & Cosmetics	515,594
Sub-total (Narrow)	6,143,037
Wide Mouth Containers	
Foods	*2,121,450
Dairy Products	228,821
Medicinal & Health Supplies	315,386
Chemicals, Household & Industrial	138,291
Toiletries & Cosmetics	108,659
Packers' Tumblers	186,095
Sub-total (Wide)	3,098,702
Total Domestic	9,241,739
Export Shipments	200,949
TOTAL SHIPMENTS	9,442,688

* This figure includes Home Canning.

GLASS CONTAINER PRODUCTION AND INVENTORY

(All Figures in Gross)

		Production April 1953	Stocks April 1953
Foods; Medicinal & Health Supplies; Chemicals, Household & Industrial; Toiletries and Cosmetics	Narrow Neck	3,593,007	3,157,278
	Wide Mouth	*3,026,942	*3,246,823
Dairy Products		238,057	301,016
Beverages, Returnable		957,810	1,102,979
Beverages, Non-returnable		159,493	150,499
Beer, Returnable		319,612	273,743
Beer, Non-returnable		729,662	387,161
Liquors		773,340	750,108
Wines		298,220	255,181
Packers' Tumblers		194,577	115,852
TOTAL		10,290,720	9,740,640

* This figure includes Home Canning.

LACLEDE-CHRISTY ELECTS DIRECTORS AND OFFICERS

At the Annual Meeting of Stockholders of Laclede Christy Company, the following directors were re-elected: Wm. H. Armstrong, Herbert F. Boettler, J. LeBeau Christy, Walter W. Shipley, J. D. Streett, Erwin P. Stupp, and J. Gates Williams.

At the Annual Meeting of Directors held the same day, the following officers were elected: J. D. Streett, President; L. C. Hewitt, Vice President; Walter W. Shipley, Vice President; E. J. Williams, Controller and Secretary; and J. H. Schoemaker, Assistant Secretary and Assistant Treasurer.

STEUBEN APPOINTMENT

John M. Gates, Vice President of Steuben Glass, Inc., has been placed in charge of both the sales and design activities of the company, it has been announced by Arthur A. Houghton, Jr., President.

Mr. Gates is succeeded as Director of Design by Mrs. Robina P. Haynes. Mrs. Haynes has also been elected Assistant Vice President. Other new officers of the company are James A. Thurston, Director of Sales, who has been elected Assistant Vice President, and Miss Cecelia R. Hessinger, elected Assistant Treasurer.

12% increase in production over other natural draft furnaces in the mill

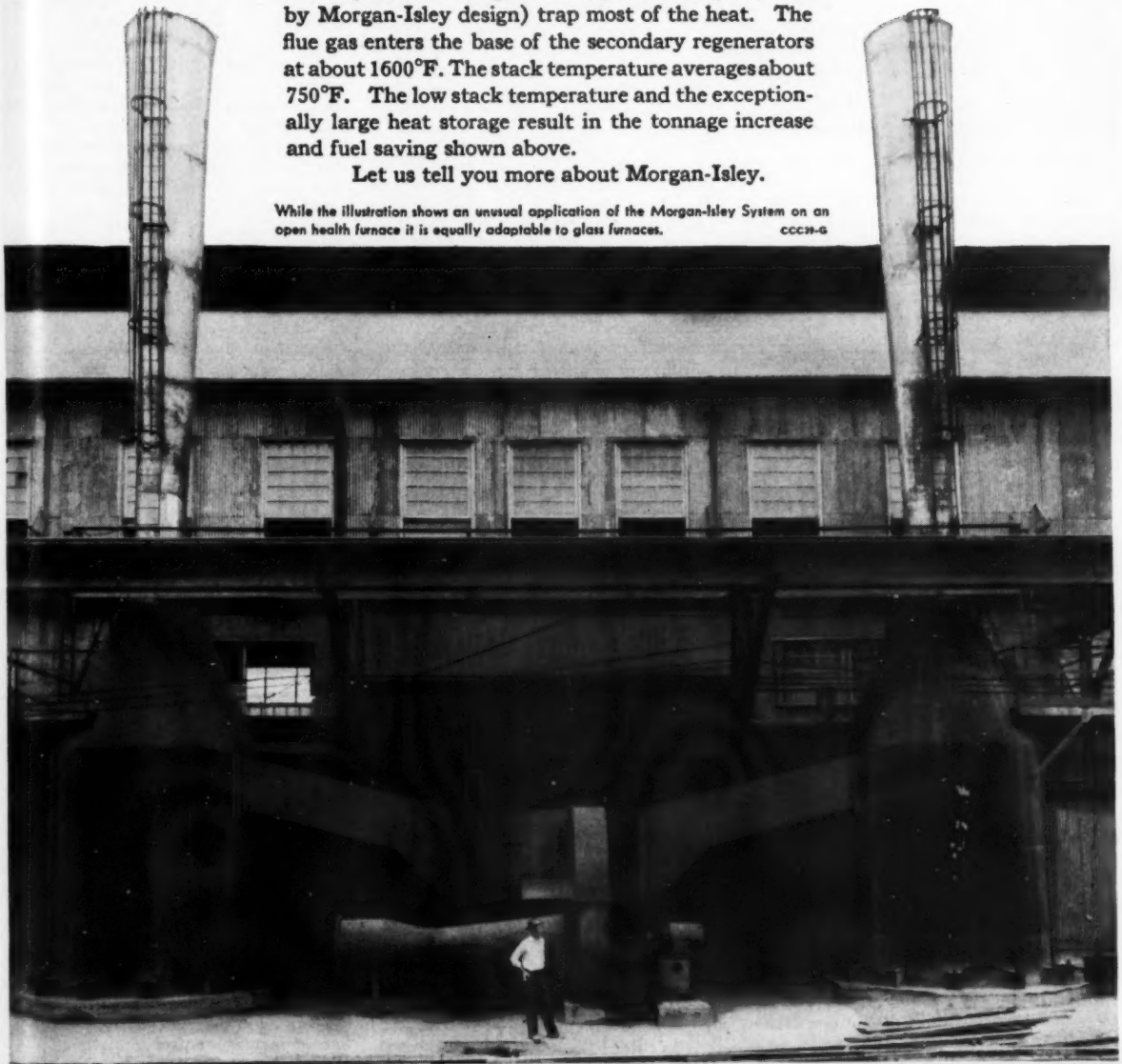
11% decrease in fuel burned per ton

. . . that is the 2-year record of this Morgan-Isley controlled open hearth at the Alan Wood Steel Company

The open hearth has a 125-ton capacity, burns up to 500 gallons of oil per hour operating on a hot charge. Primary and extra large secondary checkers (permitted by Morgan-Isley design) trap most of the heat. The flue gas enters the base of the secondary regenerators at about 1600°F. The stack temperature averages about 750°F. The low stack temperature and the exceptionally large heat storage result in the tonnage increase and fuel saving shown above.

Let us tell you more about Morgan-Isley.

While the illustration shows an unusual application of the Morgan-Isley System on an open health furnace it is equally adaptable to glass furnaces. CCCH-G



MORGAN CONSTRUCTION COMPANY WORCESTER, MASS.

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New Equipment and Supplies

BELT CONVEYOR CARRIER

Stephens-Adamson Mfg. Company, Aurora, Illinois, has announced its new 220-series Simplex belt conveyor carriers designed with spun end rolls and welded steel frame.

Seamless steel tube houses tapered roller bearing and is bored for precision alignment between roller diameter and bearing. Die cast labyrinth seal protects the bearing which can be adjusted for proper clearance by taking up nuts which support rolls in carrier brackets. Rolls can be lifted from the frame for inspection without tools. Flexible high pressure lubrication tubes can be arranged for three-shot lubrication from one or both sides of the conveyor. Roller assemblies and parts are interchangeable.

PORTABLE HAND VIEWERS

Stocker & Yale, Inc., Marblehead, Mass., has announced two new fluorescent portable inspection units with or without magnification. An ideal cool light source, these units were designed primarily for use wherever close viewing is necessary, and offer intense, glare-free white light without the objection of heat and at low cost.

Small in size yet large in ability, the two or four power lens is straddled by twin fluorescent lamps for maximum seeing ability and comfort. The new Lite-Mite units can be equipped instantly for ultraviolet radiation. Lamps are rated at 7500 hours life.

DOUBLE-RANGE INDICATING MILLIVOLTMETER

Minneapolis-Honeywell Regulator Company, Industrial Division, Philadelphia 33, Pa. has announced the development of a single-point, double-range indicating millivoltmeter pyrometer, incorporating a newly-designed plug-in galvanometer.

The new dual temperature indicator is said to be more stable in operation, relatively free from the effects of vibration and temperature, and more easily serviced than earlier types of millivoltmeters. Two combinations of ranges (0° to 2400°F. and 0° to 3000°F., and 0° to 2000°F., and 0° to 3000°F.) will be offered as standard. Other combinations will be supplied on a special basis.

Housed in a die-cast aluminum case, the new instrument has two compartments, each with separate covers. The upper compartment contains the plug-in galvanometer unit. It is totally enclosed to protect the calibrated measuring systems and the scale and pointer from dust and foreign particles. Terminal connections are in the lower compartment. These are completely accessible upon removing the cover.

For each combination of ranges, a different galvanometer is supplied, incorporating different combinations of springs, bimetallic spirals, and span adjusting resistors. Two such resistors are provided, each connected to form a separate measuring circuit for each range. Thermocouples are the detecting element for the new double-range indicator.

CATALOGS RECEIVED

Pangborn Corporation, Hagerstown, Maryland, has issued Bulletin No. 100A describing the blast cleaning hose machines which are produced for industry hand-operated cleaning jobs.

The new 28-page bulletin points out that, in spite of spectacular advances in automatic equipment and airless blast cleaning, there are many jobs which can only be accomplished by the use of hand-operated nozzle blast cleaning equipment. The two fundamental methods of applying the abrasive, direct pressure and suction, are described, as well as the applications of both wet and soft abrasives. Tables are printed which show the relationship between orifice area and circumference in nozzle sizes and air flow with required hp to develop air jets of varying diameters.

Selection of the proper type of Pangborn blast cleaning hose machine is thoroughly discussed in the book. A useful table graphically shows how to match the nozzle size to the size of the abrasive being used. Various blast cleaning accessories are pictured and described, and specifications are given for the various types of Pangborn abrasives available along with recommendations for their use.

Marietta Concrete Corporation, Marietta, Ohio, has published a new 12-page catalog concerning Modern Industrial Storage Systems.

After a brief introduction highlighting the firm's background and facilities, the booklet goes on to discuss various applications of its storage systems construction advantages including foundations, floors and shelves, roofs, walls, and details of storage system construction. Each feature is discussed and illustrated. Also included in the bulletin is an industrial silo capacity chart.

Pittsburgh Corning Corporation, One Gateway Center, Pittsburgh 22, Pa., has issued a new 24-page booklet, "Foamglas: Low Temperature Space Insulation for Walls, Ceilings, Floors."

The booklet contains information about the many application methods for Foamglas on ceilings, walls, and floors. It lists finishes, suggested thicknesses, insulation values (in typical construction), and properties of Foamglas. The material is presented in an easy-to-read and follow fashion with many illustrative drawings, and pictures showing actual Foamglas installations.

Cratex Manufacturing Company, 81 Natoma Street, San Francisco 5, California, has issued a new Catalog No. 53 which presents the adaptability, versatility, and application of its Rubberized Abrasives.

The new catalog contains a most complete and comprehensive treatise about rubberized abrasives on burring, smoothing, and polishing operations and their use in industrial establishments. All Cratex products are made in four standard "grit types" ranging from relatively coarse to extremely fine textures, and give excellent results on ceramics, hard or soft metals, and other materials.

Reliance Electric & Engineering Company, Cleveland, Ohio, has released an informative booklet describing and illustrating a newly-improved electronic adjustable-speed drive of from ¾ to 3-hp. designed for powering a wide range of small industrial equipment economically.

Featuring the Reliance V*S, Jr., the 12-page bulletin reviews ten outstanding operating functions and performance features. It describes the components and optional accessories of the V*S, Jr., gives its physical dimensions and five different horsepower ratings in which the unit is available, graphically charts horsepower and torque characteristics, and enumerates six specific ways in which industry utilizes this improved drive to increase output, reduce costs, and improve product quality.

Cambridge Wire Cloth Company, Cambridge, Maryland, has published a new four-page folder on its woven wire conveyor belts.

The folder discusses various applications and the suitability of a particular belt weave for a particular plant and shows a photograph of the application.

Beckman Instruments, Inc., South Pasadena 1, California, has made available its Reprint R-56-250 which deals with the evolution, design and utility of flame photometry in routine laboratory analysis, research, and industrial process control.

The reprint gives typical industrial applications of flame photometry and includes a table giving wavelengths and detection limits of various elements.

Bailey Meter Company, 1050 Ivanhoe Road, Cleveland 10, Ohio, has issued Bulletin 18, a comprehensive catalog offering information on its complete line of meters, control equipment, and engineering services. It is written for engineers in process plants, power plants, and public utilities.

Fifteen measured variables common to power and process operations form the index for selecting appropriate metering and control equipment.

GARDEN-FRESH fruit and vegetables look their best put up in gleaming glass jars. And packers have found this eye-appeal a definite asset on grocery shelves, too.

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WYANDOTTE CHEMICALS OPENS NEW RESEARCH CENTER

Wyandotte Chemicals Corporation's Research Center at Wyandotte, Michigan, went into full operation on June 7 dedicated to providing more and better chemical products for industry and the public. Robert B. Semple, President of the firm, said the new Center will contribute further to Wyandotte's rising importance in research and development activities.

The new laboratories, which cover about one city block, are of modern two-story brick construction, with a full basement laid out roughly in a T-shape. These laboratories, together with the Pilot Plant, High Pressure Laboratory, and the Clark Street building, comprise the Wyandotte Chemicals Research Center.

The new Research Center permits a consolidation of Wyandotte's many research and development activities and will enable the company to materially expand not only its long-range research within the organic and inorganic chemical fields, but special research projects assumed by the company on behalf of national defense.

The Research Laboratories of the Center embody a new concept of industrial laboratory design and construction, including laboratories with movable walls and built-in services that make them as flexible as movie sets. Included in the Center are special areas devoted to exploration in such fields as radioactive tracers, nucleonics, electronics, organic and inorganic chemistry, sanitation and germicides, electroplating, physics, and the entire field of commercial cleaning.

Although research has always constituted an integral part of Wyandotte's activities since its founding in 1890, it was not until 1934 that the various groups conducting research were brought together into one completely coordinated department. The staff, which began with a few individuals working in one room, has grown to the present group of more than 200 people and the fields of work have been extended from alkalies and alkaline cleaners to encompass a widely varied organic research program, as well as inorganic, product application, and government contract research.

The basic objective of the Research and Development Division is to contribute, in cooperation with all other Divisions, to the continued welfare and growth of Wyandotte Chemicals and to that of its customers by providing opportunities for its staff to work on carefully selected problems with adequate facilities and understanding guidance.

ARIDOR-GENERAL CAP CONSOLIDATION

The consolidation of two long-established Chicago cap and closure firms, the Aridor subsidiary of Ball Brothers, Company Incorporated and General Cap and Closure, Division of the Jaques Manufacturing Company, has been announced by the Ball company officials in Muncie, Indiana.

Consolidation of the two closure plants, according to Edmund F. Ball, President of the Ball firm, eventually will combine all manufacturing facilities of General Cap with those of the Aridor Company, whose plant and sales headquarters are at 3428 West 48th Place in Chicago's Central Manufacturing District.

The new combination, Mr. Ball said, will make Aridor one of the principal suppliers of commercial screw and lug-type caps and closures. Mr. Ball's announcement said that Willard Jaques, President of Jaques Manufacturing, will serve the new Aridor organization in advisory and consulting capacities until details of the consolidation are completed.

A. V. Smith, Aridor's General Manager and an associate in the Ball organization since 1948, will be General Manager of the combined operation, according to Duncan C. Menzies, Ball Executive Vice President and General Manager. Mr. Menzies also announced that Harry F. McCracken, formerly Sales Manager at General Cap, has been named as Sales Manager of the new Aridor-General Cap organization.

"We contemplate no changes in the present sales organizations of either the Aridor Company or General Cap, excepting that Mr. McCracken becomes our new Sales Manager," Mr. Menzies said. "Otherwise the Aridor sales staff and that of General Cap will continue to function in their separate entities." Each sales group will continue to serve its own customers for the time being.

KIMBLE APPOINTMENT

J. B. Shimer, Manager of the Kimble Glass Company's Columbus, Ohio, plant, has been made assistant to the company's General Factories Manager, S. A. Kenworthy. He will coordinate all television bulb operations in plants operated by the Owens-Illinois Glass Company subsidiary at Toledo and Columbus, Ohio, and Sayreville and Vineland, New Jersey.

Raymond W. Gatti, Superintendent of the Automotive and Thermometer Department at Vineland, has been named Plant Manager at Columbus where the bulk of Kimble's all-glass rectangular television bulbs are produced.

Mr. Shimer left Corning Glass Works in 1946 to join Owens-Illinois as Manager of the Libbey Glass Division's Factory A. Two years later he was named Manager of the Dorr-Westwood plant. He has been with the firm since 1933.

• James W. Hensley, Research Manager of the Nucleonics Laboratory of the Wyandotte Chemicals Corporation, has gone to Oak Ridge, Tennessee, to attend a two-week advanced course in the techniques of using radioisotopes in industry. Mr. Hensley uses radioisotopes in the study of detergency and other surface reactions involving glass, metals, and fabrics.

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L-O-F FORMS NEW SECTION FOR GLASSMAKING

The formation of a new section of the Libbey-Owens-Ford Glass Company to concentrate on the improvement and design of glassmaking furnaces and equipment has been announced by C. W. Davis, Vice President in charge of Production.

The new group, to be known as the Furnace Design and Improvement Section of the Engineering Department, will be directed by Albert H. Couch, ceramic engineer, who has been transferred from the company's Development Department. He will be assisted by John H. Hansen, formerly L-O-F assistant chief structural engineer.

The furnace group will implement the decision of L-O-F management and engineers for the rebuilding of existing furnace projects, construction of new furnaces and equipment, and incorporating of any improvements recommended for new or existing projects. This new section will take over and expand the duties formerly performed by the furnace design group of the Structural Section of the Engineering Department and also the Ceramics Section of the L-O-F Development Department and will be closely integrated with L-O-F production personnel, L-O-F plants, and general offices.

Several engineers and development men have been drawn from other L-O-F departments and others have joined the company to become part of the new section. They include Lawrence I. Hill, who has been appointed to assist Mr. Hansen in the design of furnaces and related auxiliary equipment; Howard L. Miller, named to assist Mr. Hansen in furnace installations and inspections; Norman K. Gladieux, who will assist both Mr. Couch and Mr. Hansen in follow-up work on plate and window glass improvements; William D. Erard, Charles F. Green, John L. Lewis, William F. Mason, Theodore P. Sharlow, Philip R. Bretschneider, and Charles R. Johnston; Billy F. Shuler and Henry Neal Troy, two engineers who have recently joined the firm.

ANCHOR CAP & CLOSURE NAMES SALES MANAGER

W. F. Wilson, President of Anchor Cap & Closure Corporation of Canada, Limited, has announced the appointment of F. C. Maywood as Sales Manager.

Mr. Maywood, 49, was a sales representative for Anchor Cap from 1931 to 1944, operating from the headquarters at Toronto. He transferred to the Closure Sales Division of the parent company, Anchor Hocking Glass Corporation, in 1944, where he was stationed for one year.

In 1945, he moved to the San Francisco office of Anchor Hocking as a sales representative. In 1950, he was named Manager of the San Francisco office, in which capacity he served as Sales Manager of Northern California for Maywood Glass Company, an Anchor Hocking subsidiary, and for the Pacific Coast Closure Division of the parent company.

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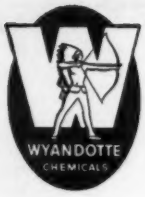

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3 **Assurance of prompt, economical delivery** because of Wyandotte's central location and easy accessibility to railways and truck lines. Wyandotte Soda Ash is as convenient to you as your telephone!

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CHEMICALS

INVENTIONS AND INVENTORS . . .

(*Continued from page* 319)

exit pupil. The components of the objective are shown dotted.

The eyepieces of all the examples consist of four components and six lenses L_1 to L_6. The first component (towards the objective) comprises two lenses L_1 and L_2 having between them a very highly curved cemented surface acting in a diverging manner, which is concave towards the objective. The real image plane B lies near the first surface, which is plane in these examples but is not necessarily so in every case. The second and third components are simple converging lenses L_3 and L_4, and the fourth component comprises two lenses L_5 and L_6 having between them a cemented surface highly convex towards the objective.

In Fig. 10, the various elements of the eyepiece are shown in full lines. An indication of an objective is given in dotted lines to show how the eyepiece cooperates therewith. By means of the invention, it is possible with a suitable construction of the objective to obtain, in addition to a large image field of the outside view, a satisfactory image of the graduations and the like over a wide range of angle.

The patent contains three claims and the references cited were: 1,468,762, Taylor et al., Sept. 25, 1923; 1,478,704, Erfle, Dec. 25, 1923; 2,267,832, McCarthy, Dec. 30, 1941; 2,423,676, Altman, July 8, 1947; 461,062, Germany, June 13, 1928; 409,465, Great Britain, May 3, 1934; and 248,246, Switzerland, Feb. 16, 1948.

Glass Seals. Fig. 10. Patent No. 2,629,971. Filed September 14, 1945. Issued March 3, 1953. One sheet of drawings. Assigned to United States of America as represented by the Secretary of War by Milton D. Hare.

In Fig. 12 is shown a holder 10, usually made of carbon, holding a vacuum tube 11. The structure of tube 11 includes three cylindrical metallic members 12, 13, and 14 which it is desired to seal together. Numbers 12, 13, and 14 are firmly held in position at their lower ends in holder 10 and a glass ring 24 is then fitted at the other end of member 13. The ring is then heated until molten and press 25 also made of carbon is moved down so as to press the molten glass between the metallic members 12 and 13. Similar seals are made between 13 and 14. The machine is said to provide a method of forming glass seals of uniform and definite thickness and of uniform strength between a plurality of metallic members.

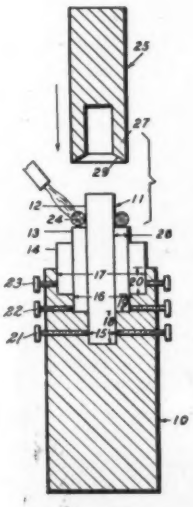

Fig. 10.

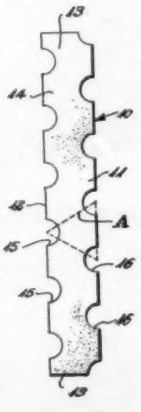

Fig. 11.

The patent contains six claims and the references cited were: 1,680,738, Hull, Aug. 14, 1928; 2,290,050, Hinkley

(*Continued on page* 332)

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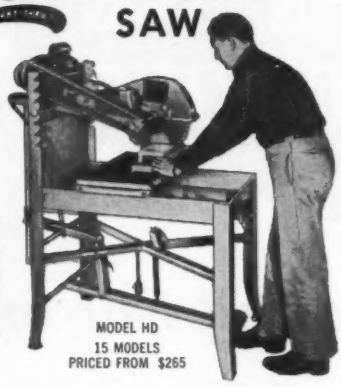

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INVENTIONS AND INVENTORS . . .

(*Continued from page* 330)

et al., July 14, 1942; 2,292,863, Beggs, Aug. 11, 1942; 2,313,025, Scharfnagel, Mar. 2, 1943; 2,315,292, Richardson et al., Mar. 30, 1943; 2,374,269, Breadner et al., Apr. 24, 1945; 2,509,906, Clark et al., May 30, 1950; and 2,511,914, Haas, June 20, 1950.

Regenerator Construction. Fig. 11. Patent No. 2,622,864. Filed June 25, 1952. Issued December 23, 1952. Two sheets of drawings. Assigned to Carbonic Development Corporation by Rudolph L. Hasche.

This invention provides an improved regenerator construction. Unit blocks composed of fused alumina or Carborundum are made in rectangular block form 10 as shown in Fig. 11. They are formed with relatively large opposed parallel faces 11 and 12 and relatively narrow edge surfaces 13 and 14. The opposed flat parallel faces 11 and 12 are each provided with a plurality of parallel straight grooves 15 and 16, each groove being substantially semi-cylindrical in transverse section and extending completely across the face of the block. The spacing between the grooves is uniform and the grooves are "staggered," that is, the grooves 16 in one of the faces lie with their axes halfway between the axes of the grooves 15 in the other face. A further feature of the unit lies in the fact that the grooves 16 are all spaced apart equal distances and the distance between adjacent grooves 16 is equal to the distance between any one of the grooves 16 and the nearest groove 15 in the opposite face, when measured through the block. The regenerator packing is simple and economical to form and provides a large mass to void ratio.

The patent contains 23 claims and the following references were cited: 2,172,714, Schack et al., Sept. 12, 1939; 2,506,244, Stopka, May 2, 1950; 2,509,168, Rice, May 23, 1950; 144,043, Austria, Sept. 23, 1903; 640,458, France, May 1, 1930. Pages 357, 358, 359, 360 and 361 of "Modern Furnace Technology," 1938 by H. Etherington; page 508 of "Refractories," 3rd ed., 1949, by F. H. Norton; and pages 795, 796 and 799 of "Process Heat Transfer," 1st ed., 1950, by D. O. Kern.

Solutions for Cleaning Glass Bottles. Patent No. 2,628,943. Filed March 21, 1950. Issued February 17, 1953. Two sheets of drawings (none reproduced). Assigned to the Allied Chemical and Dye Corporation by Martin L. Hassel.

Detergent compositions are given to clean bottles, together with inhibiting solutions that will reduce the attack of such detergents upon the surface of the glass. The solutions are especially adaptable to the washing of returnable beer, milk, and soft beverage bottles that are cleaned by means of mechanical washers.

The process is successfully carried out by washing with an aqueous alkali solution containing 1-10% caustic alkali which is substantially free of phosphates. To the above solution is added a nitrosation-sulfitation product. The latter solution is not less than 0.01% and not more than 5% by weight of the solution. The nitrosation-sulfitation product comprises a mixture of organic sodium sulfonates having carbon contents within the range 10 to 30 carbon atoms, all of which are explained in detail in the various examples included in the patent.

The patent contains 16 claims and three references.

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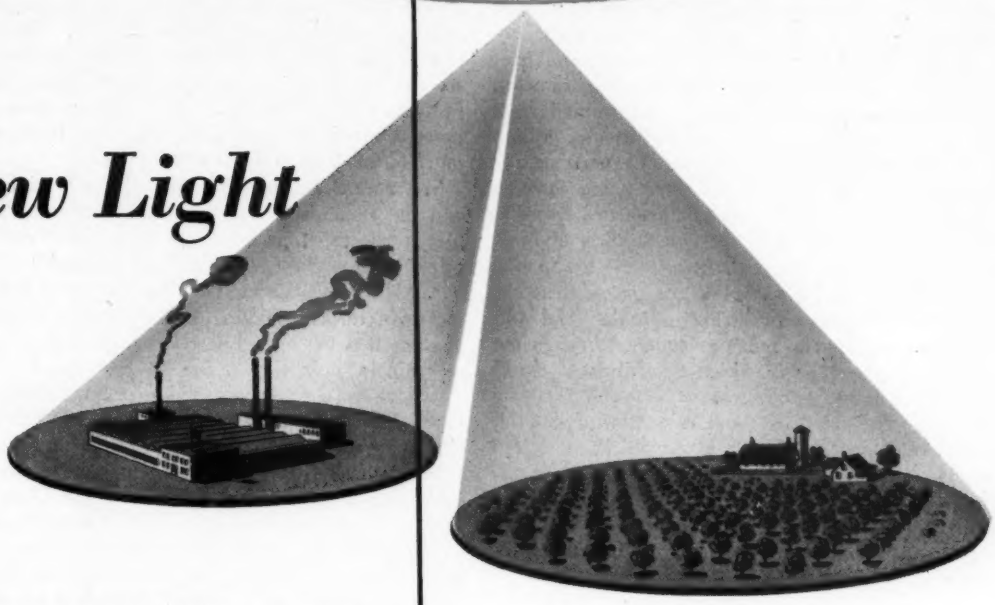

ON OLD SUBJECTS...

Agriculture and Industry are as old as written history; old subjects, it is true, but through the years chemistry has altered established formulas and radically changed the accepted methods of both.

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Potassium Pentaborate	Borax, Technical (coarse and fine granular)
Salt Cake	
Desiccated Sodium Sulphate	Pentahydrate Borax (refined)
Soda Ash	TRONABOR* Pentahydrate Borax (crude)
Sodium Pentaborate	

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A.C.S. MEETING . . .

(*Continued from page* 308)

6N acid from borosilicate bottles approached that in the glass and indicated that all the components of the glass were passing into solution.

The next paper was a theoretical one, "Diffusion in Silica Glasses," by O. L. Anderson, Bell Telephone Laboratories, and D. A. Stuart, Cornell University, and was presented by the senior author. This paper was a continuation of a similar one presented at the Pittsburgh Meeting in 1952 in which a method of computing activated energies for ionic conductivity in silica glasses was proposed. In this method, a structure parameter, r_D, was assumed which could not be determined from structure and therefore remained an empirical constant. A new method was proposed to evaluate r_D experimentally by measuring the diffusion of noblelike gases through silica glass. The constant, r_D, determined from diffusion experiments, was then used in the computation of ionic conductivity activation energies. According to Stevels, the energy required to move an ion in a glassy structure is, first, energy required to break an ionic bond and second, energy required to move or squeeze through the lattice structure. Systems in which two kinds of modifying ions are present become more complex. The activation energy becomes more than twice that of sodium. Amorphous structure in glass, however, tends to reduce ionic forces. This theory was checked for about 100 different glasses and was found to be in good agreement with the exception of K ions. This paper was well presented, and such work may ultimately explain many difficult problems.

The next paper, "Specific Heat of Vitreous Silica," by H. T. Smyth, Rutgers University, was also a continuation of a paper presented by the author at the Fall Meeting of the Glass Division. This paper was highly theoretical and involved x-ray studies of vitreous silica. The studies showed a regularity of structure in the fairly close neighborhood of each atom in the structure. An atomic model was selected which took into account the frequencies of vibration within the lattice. Specific heat calculations were shown to be possible by calculating the modes of vibration of all the atoms in each of the small groups which are repeated with random orientation throughout the network. A complex electrical analogue was set up to facilitate the calculations.

It was suggested that a mechanical model utilizing weights and springs might be useful, but it was concluded that such a model would be less practical than an electrical computing machine. This project was sponsored by the Office of Naval Research.

The last paper on the program was "Coexisting Structures in Vitreous Silica," by C. L. Babcock and W. W. Barber, Owens-Illinois Glass Company, and Kasimir Fajans, University of Michigan. The paper was presented by Mr. Babcock. Attempts were made to analyze the structure of vitreous silica because of its paramount influence on the properties of all silicate glasses achieved commercially by the addition of other oxides to SiO_2. The paper postulated that the various properties of vitreous silica may be due to two coexisting, distinctly different atomic arrangements and that the relative equilibrium of these arrangements may depend upon temperature. At a given temperature, the structure dominant at low temperatures had a larger volume than the one dominant at high temperatures. The low-temperature structure involved relatively weak cohesive forces as compared with the high-temperature structures. The assumed structural change on heating explained the unusual temperature dependence of elastic properties and volume of vitreous silica, as well as the recent finding by Douglas and Isard that the volume which it assumed at room temperature decreased with increasing temperature from which it had been quenched. The coexistence of relatively weak and strong forces was shown by the low-temperature heat capacity, infrared, and Raman Spectra. The described time-temperature dependence of the SiO_2 structure opened an additional avenue of approach to glass technology problems. This was an excellent paper which was ably presented, and it is hoped that the Glass Division will see more of this type in the future.

The annual Business Meeting of the Section followed, and the Committee on Papers and Programs suggested that future meetings involving symposia of various types or meetings with other groups be encouraged.

The Research Committee has encouraged the publication of the translation of more foreign articles. It is possible that the libraries of the various glass companies may aid in their distribution and loan to other libraries.

The Secretary was directed to send a congratulatory message to Bottomly, Hutton, and Paget in celebration of the 50th year of the founding of silica glass production.

Recommendations of a special committee designed to study future policies and activities of the Glass Division were discussed and tabled for further consideration.

The newly elected officers of the Division are as follows: Trustee: O. G. Burch, Owens-Illinois Glass Company; Chairman: N. J. Kreidl, Bausch & Lomb Optical Company; Vice-Chairman: F. L. Bishop, American Window Glass Company; and Secretary: F. V. Tooley, University of Illinois.

The Fall Glass Meeting was announced for October 9 and 10, 1953, at Rochester, New York.

Among the highlights of the Meeting was the naming of Jesse Talbot Littleton, Vice President and former Director of Research of Corning Glass Works, as an honorary member of the Society. E. Ward Tillotson, Chairman of the Committee of Selection of Honorary Members, called attention to his long career and his invaluable service to the Society. (He served as chairman of the Publication Committee, 1932; Trustee, Glass Division, 1935-1938; Vice President, 1941; President, 1942). His counsel during formation of the Glass Division was eagerly solicited and freely given.

He was born July 7, 1887, at Belle Haven, Virginia. His early education was obtained from private tutors. He was graduated from Southern University, Greensboro, Alabama, 1906, with the degree of A.B.; from Tulane University of Louisiana, 1908, M.A.; University of Wisconsin, 1911, Ph.D. He was laboratory assistant at Southern University, 1905-1906; research fellow at Tulane University, 1906-1908; research fellow, University of Wisconsin, 1908-1909; assistant in physics, University of Wisconsin, 1909-11; instructor in physics, University of Michigan, 1911-1913; physicist, Corning Glass Works, 1913-20; chief of Physical Laboratory, Corning Glass Works, 1920-1940; assistant director of research, Corning Glass Works, 1940.

Dr. Littleton's scholastic and technical associations are

(*Continued on page* 336)

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Drakotherm

Since the introduction of Drakotherm containing colors for screen process printing, continued research, coupled with extensive field experience by our technical staff, has resulted in important improvements in this thermo-plastic medium.

NOW Drakenfeld Colors in Drakotherm have all these advantages:

1. Availability in both high and low melting ranges.
2. Prints harden instantly to non-tacky surfaces when they touch the ware. No waiting for colors to dry or ware to cool.
3. Colors *stay* fluid by simplified resistance heating of the metal mesh stencil or by thermostatically-controlled radiant energy heaters.
4. Fire down smoothly.
5. Permit immediate subsequent color application cold, in regular squeegee oils.
6. Print razor sharp, with the finest detail, even to the smallest letters used on the back labels of packers' ware, cosmetic jars, and bottles. No smudging. No smearing.
7. Minimized screen clogging. Costly "time out" for washing practically eliminated.
8. Eliminate driers.
9. Ideal for automatic and semi-automatic equipment.
10. Reduce number of misprints.
11. Offer the designer greater latitude in creating new designs.
12. Permit printing attractive wrap-around designs on tumblers.

Drakotherm-containing colors have won wide acceptance since they were first introduced Get acquainted with the latest improvements. Special formulations are available for your particular needs. Learn how much those fast-printing colors can save in time and money for *you*. Phone, write for complete information.

DEPENDABLE SERVICE ON: Acid, Alkali and Sulphide Resistant Glass Colors and Enamels . . . Silver Paste . . . Crystal Ices . . . Squeegee and Printing Oils . . . Spraying and Banding Mediums . . . Glassmaker's Chemicals . . . Glass Decolorizers . . . Glass Frosting Compounds . . . Decorating Supplies

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Phone: HEmlock 1-8800

A.C.S. MEETING . . .
(*Continued from page* 334)

numerous: Fellow, American Physical Society; Fellow, American Association for the Advancement of Science; Fellow, American Institute of Electrical Engineers; Fellow, American Optical Society; Fellow, American Ceramic Society. Chairman, Glass Division, American Ceramic Society, 1929-1931; Member, Advisory Committee on Applied Physics, American Physical Society, 1935-1939; Member, Editorial Staff, *Journal of Applied Physics*, 1937-1938; licensed engineer, 1936. Chairman, Publications Committee, American Ceramic Society, 1932; Trustee, American Ceramic Society, 1935-38; President, American Ceramic Society, 1942. Member, Physics Committee, National Research Council, 1930 to date; member, Chemical Committee, National Research Council, 1930 to date; member-at-large, Ithaca Section of A.I.E.E.; licensed engineer, New York State, 1936; member Deutsche Glastechnische Gesellschaft; member, American Society for Testing Materials; chairman, Section 4 of Committee C-14 on Glass, A.S.T.M.

Dr. Littleton has received patents on various glass articles and processes. In 1933, as co-author with G. W. Morey, he published the book, The Electrical Properties of Glass. He has also added to the literature of glassmaking by contributing 11 papers to various scientific and technical journals. One in particular should be mentioned here: "A Review of Recent Progress in the Study of Thermal Treatment of Glass" (*J. Soc. Glass Technol.*, 15, 262-306 (1931)) by invitation of the British Glass Research Association Fund. Also, as co-author with other scientists, he has published 14 papers and monographs of value to the craft of glassmaking and glass technology. He was one of two scientists from this country invited to address the International Glass Congress in London in July, 1936.

GLASS CLOTH TESTS FOR THE AIR FORCE

A large volume of technical data on the physical properties of glass fabric-polyester laminates has been developed in a series of tests undertaken jointly by Libbey-Owens-Ford Glass Company and eight large weavers of fiber glass cloth for the Wright Air Development Center of the U.S. Air Force at Dayton.

The task is estimated to have saved the Air Force at least $70,000 and given it the basis for new technical bulletins, revised specifications, and important fundamental and factual information about the performances of different weaves of glass cloth, weights of fibers, and treatment of the cloth preliminary to lamination. All the tests included the Garan finish, acquired by L-O-F last year. Fiber glass-plastic laminates are being used not only for radomes and other aircraft parts, but for body armor, automobile bodies, bathtubs, boats, furniture, fishing rods, toys, and scores of experimental uses.

• W. H. Rowand, chief engineer of the Boiler Division of The Babcock & Wilcox Company, has been elected a Vice President of the company. He will continue to hold the post of divisional chief engineer. Mr. Rowand joined the firm in 1929.

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As little as 1% of F. W. Smith Brand Borax added to soda-lime glass speeds up production and increases the mechanical and thermal strength of the glass.

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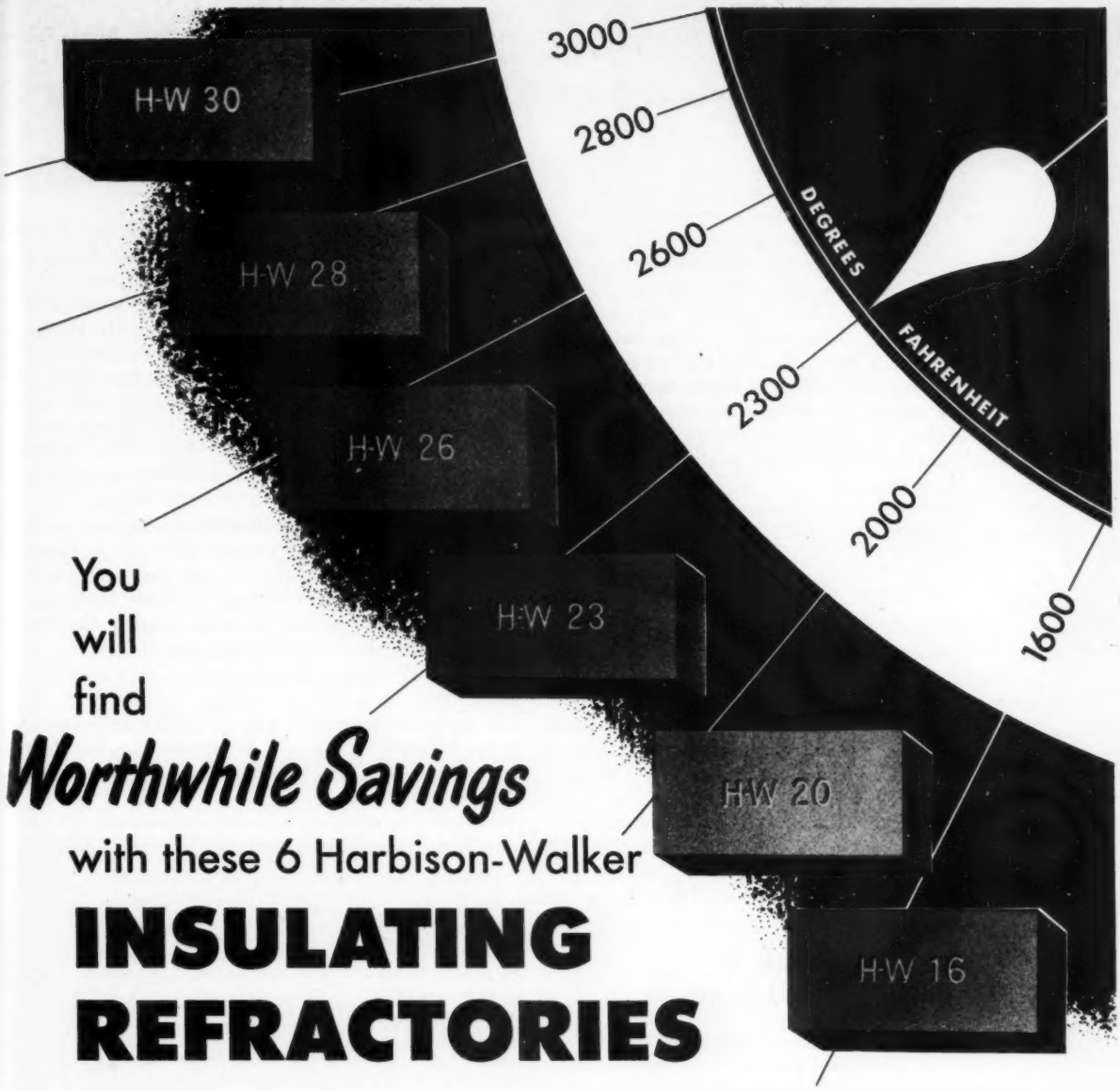

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INSULATING REFRACTORIES

The balanced properties of Harbison-Walker Insulating Brick mean superior performance and dependable service. Light weight, essential to high insulating value and low heat storage, has been attained to the greatest degree consistent with the good mechanical strength necessary for handling and for many furnace structures.

Available in six classes, suitable for service in the temperature ranges indicated above, Harbison-Walker Insulating Brick reduce heat losses, save space, absorb noise, conserve fuel.

H-W 85 and H-W 56 CASTABLES are widely used to great advantage in monolithic structures for refractory insulation.

We will gladly send you bulletins containing data and descriptive information about Harbison-Walker Insulating Brick and Insulating Castables.

Harbison-Walker Engineering Service will help you with the selection of the insulating refractories best suited for your requirements.

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
World's Largest Producer of Refractories
GENERAL OFFICES PITTSBURGH 22, PENNSYLVANIA

TEMPERATURE CONTROL . . .
(*Continued from page* 314)

reduced fuel bills such as many companies have experienced after changing over to unit heaters.

Flexibility Assured

Compactness of the unit heaters is an especial plant design asset. A unit heater like the ones installed at Hamilton weighs approximately 100 pounds, yet has the heating capacity of an old-style setup which uses over a ton of cast iron radiating surface or pipe coil.

This compactness offers advantages not only in cutting down the initial cost of the heating system, but also in saving space in the factory. Mounted high on the ceiling and walls, the unit heaters are out of the way and leave valuable floor space for use by plant equipment. This compact design of the unit heaters also assures the Hamilton Glass Company of a flexible heating system. The units can be rearranged easily without having to repattern the entire heat distribution system, a particular advantage in the event of future plant expansion.

CORNING STAFF CHANGES

Seven executive promotions and the establishment of three new positions were announced recently by Corning Glass Works. Two of the newly-created posts are in the company's Manufacturing and Engineering Division.

Appointed to the new post of Chief Planning Engineer is Justin J. Pfeiffer, formerly manufacturing manager of the Technical Products Division. He has been a member of Corning Glass Works for 36 years and is a former manager of Fall Brook and Central Falls, Rhode Island, plants.

The second of the new posts, that of Chief Process Engineer, is being filled by Dr. Charles F. DeVoe, who has been connected with development work for Corning, especially in the melting field, for the past 16 years. He is a former manager of both Pilot Plant No. 1 and Pilot Plant No. 2.

Named to manage Pilot Plant No. 2 is Robert E. Ellett, who joined the company in 1950 as senior design engineer in the Mechanical Development Department. He has been process and quality engineer for the Electrical Products Division since last April. Succeeding Mr. Pfeiffer as manufacturing manager of Technical Products is Paul T. Clark, formerly manager of Pressware Plant. Mr. Clark joined Corning in 1934 and has had wide experience in both line and staff work, and has been plant manager successively at Fall Brook Plant and Pressware Plant. He recently completed a course in advanced management training at Harvard Business School.

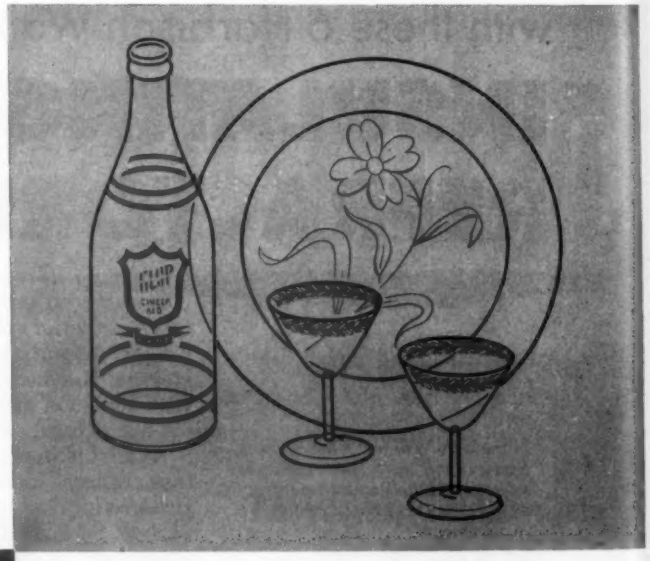
Appointed to the new position of assistant general manager in the Electrical Products Division is Campbell Rutledge, Jr. Mr. Rutledge for the past year had held a similar post in the Technical Products Division. He has a broad background in sales, joining Corning in 1938 as a member of industrial sales.

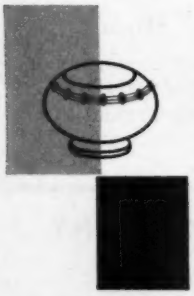
Forrest E. Behm, Jr., associated with Corning since World War II, is the new manager of Pressware Plant, and named to succeed him as production superintendent at the Pressware Plant is J. L. Rhodes who, for the past three years has held a similar post at the company's Central Falls plant.

Du Pont Glass Colors

FOR UNIFORMITY
AND EASE OF APPLICATION

THERE'S a complete line of Du Pont glass colors for your decorating needs. Each of these durable colors is produced against a permanent standard . . . assures maximum coverage over a wide firing range. You can be sure of uniformity and sparkling appeal with all Du Pont colors . . . and, as always, Du Pont technical men will be glad to give you prompt assistance. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Del.





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These glassmakers proved to themselves that B&W's specialized refractories paid off in longer campaigns. Why not use them in your tanks?

PLANT	LOCATION OF B&W REFRACTORIES
New York Manufacturer of Container Glass	B&W Dense 80 Firebrick in 1st & 2nd ports. B&W 80 Firebrick in checkers.
Ohio Manufacturer of Clear Glass	B&W 80 Firebrick in port construction, regenerator arches and walls, and top 8 to 10 courses of checkers. B&W Juniors in wall type checkers. B&W Allmul burner blocks.
Ohio Manufacturer of Container Glass and Colored Borosilicates	B&W Dense 80 and Junior Firebrick in checkers. B&W Dense 80's in burner block necks and B&W Juniors in ports.
Pennsylvania Manufacturer of Container Glass	B&W 80 Firebrick in ports, regenerator arches and walls as well as top 10 to 14 courses of checkers.
West Virginia Manufacturer of Glass for Fluorescent Lamps	B&W Junior Firebrick in checkers and ports.
Kentucky Manufacturer of Glass for Bulbs	B&W 80 Firebrick in ports, and B&W Junior Firebrick in checkers.
West Virginia Manufacturer of Plate and Window Glass	B&W 80 Firebrick in ports and regenerator crowns.
Pennsylvania Manufacturer of Container Glass	B&W Allmul Firebrick used in complete refining end.

PROPERTIES OF B&W HEAVY FIREBRICK

	B&W ALLMUL	B&W 80	B&W JUNIOR
Recommended use limit, F	3200	2950	2850
Fusion point, F	3335	3190	3173
Hot load strength, % deformation, 25 psi, 1½ hours	Less than 2% @ 3050F	Less than 1% @ 2640F	Less than 2% @ 2640F

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R475

EXTENSIVE USE OF GLASS BLOCKS IN NEW MENNEN PLANT

Glass blocks are used extensively in the new Mennen Company office-plant building near Morristown, New Jersey, both for beauty and functionalism.

The glass blocks selected by architects, A. M. Kenney Associates of Cincinnati, Ohio, are scientifically designed to control daylight. The blocks also have a good insulating value, shut out dirt, are easy to clean, and reduce future maintenance costs.

The new Mennen plant contains about 16,500 glass blocks manufactured by Pittsburgh Corning Corporation. Light-directing and light-diffusing blocks have been used to control the daylight. Also, some transparent glass blocks have been set in certain panels along with the functional patterns to allow outside vision.

O. G. BURCH NAMED O-I ENGINEERING-RESEARCH COORDINATOR

Oscar G. Burch, Vice President of Owens-Illinois Glass Company, has been assigned to coordinate all of the company's engineering and research activities, Carl R. Megowen, Owens-Illinois President, has announced.

These activities are carried on in the Administrative, Glass Container, Pacific Coast, Libbey, and Kaylo Divisions, and in a subsidiary, Kimble Glass Company. Mr. Burch has named as his assistants John D. Northup to be Director of Engineering, and James W. Hackett to be Director of Research.

Mr. Burch has been associated with Owens-Illinois since 1931, first as research chemist at the Alton, Illinois, plant, then as Manager of the General Research Division. He was appointed director of the company's research program in 1946 and elected Vice President in 1950.

Mr. Northup, who joined Owens-Illinois in 1933, managed two of its glass container plants and for the past five years has supervised corrugated manufacturing operations. As Director of Engineering, he will be responsible for construction of new company facilities and major revisions to old ones. He will also coordinate the development and engineering work of the divisions and the subsidiary.

Mr. Hackett, Manager of the General Research Division since 1951, will direct the company's general research program and the process development work carried on in the General Research Division for the manufacturing units of the company.

Owens-Illinois Glass Company last year spent $6,971,189 for research, development, and engineering, the highest such expenditure in its history. It employs about 700 people in its laboratories and engineering departments and sponsors 15 research projects in universities and consulting laboratories.

F. H. WHEATON, JR., HONORED

Announcement has been made by the Millville, New Jersey, Board of Trade of its selection of Frank H. Wheaton, Jr., as the Outstanding Citizen of Millville for 1952.

The award is conferred annually upon the Millvillian who, during the preceding year, contributed most to the civic and industrial advancement of the city. In being thus honored, Mr. Wheaton follows the tradition of his father who was the first to receive the tribute upon its inception in 1935.

Mr. Wheaton, who at 40 is the youngest recipient of the distinction, is President of the Wheaton Glass Company and Wheaton do Brasil, S.A. He recently returned from a sojourn in Sao Paulo, Brasil, where the newly-constructed Wheaton plant is producing glass containers for the drug and pharmaceutical trades.

BAUSCH & LOMB ELECTS TWO NEW VICE PRESIDENTS

The election of Lysle B. "Mac" McKinley as Vice President in charge of Scientific Instrument Sales, and Carl A. Day as Vice President in charge of Manufacturing have been announced by Bausch & Lomb Optical Company.

After serving as a Bausch & Lomb instrument salesman in several mid-Western and Eastern states from 1929 to 1942, Mr. McKinley went to Rochester to become assistant to the chief inspector of military instruments. In 1946 he was appointed administrative assistant to the vice president of the Scientific Instrument Division, and a year later was promoted to Sales Manager of the Division. In this post he not only stepped up dealer and branch sales activities, but was instrumental in fostering the development of several new products. Mr. McKinley is Chairman-elect of the Optical Section of the Scientific Apparatus Makers Association, and active member of several optical associations, and second Vice President of the Sales Executives Club of the Rochester Chamber of Commerce.

An engineer, Mr. Day joined the optical firm in 1931 after graduating from the U.S. Naval Academy. After a year's factory training, he joined the Scientific Instrument Sales Division. In 1942 he transferred to the Manufacturing Division where he coordinated production of optical gunfire instruments for the armed services. He was later promoted to Works Manager of all Rochester manufacturing, production control, and plant maintenance activities. In 1947 he established the company's eyeglass frame plant at Wellsville, New York, and later was also responsible for complete development of the firm's lens plant at Midland, Canada. He is an active member of the American Society of Mechanical Engineers, Optical Society of America, and the American Management Association.

• Sam E. Gewin has been appointed District Manager of the St. Louis office of The Bristol Company, according to a recent announcement. Mr. Gewin joined the firm in 1937.

. . . for Spraying, Squeegee, and Brush Application

HOMMEL GLASS COLORS assure satisfaction . . . the kind of satisfaction that gives you uninterrupted production . . . true uniform colors from shipment to shipment . . . HOMMEL Technicians will match any color to the most exacting specifications.

HOT SQUEEGEE PRINTING* Don't overlook this HOMMEL development that keeps screens clear and instantly dries the design on the glass. Write today for a HOMMEL representative to show you hot squeegee printing.

ACID RESISTING for table and laboratory glass ware.

ALKALI RESISTING brilliant and opaque qualities are retained after repeated washings in strong alkali solutions of beverage and milk bottles.

SULPHIDE RESISTANT unaffected by the toughest atmospheric conditions, a longer brilliant life for outdoor signs.

WRITE OR WIRE TODAY—We welcome the opportunity to show you how we can match your color requirements. We can help you produce better Glass Ware.

*PATENT APPLIED FOR

ICES a permanent crystalline finish of sparkling beauty.

GOLD Liquid Bright Golds, Brown Golds Powder, Paste Golds, Liquid Burnish Gold. Made to give maximum adherence and wearing qualities under your production conditions.

SQUEEGEE OIL Hommel squeegee oil has proved to be the best under all conditions . . . sharp prints . . . clear screens . . . stable colors . . . no bleeding no disagreeable odors. Write for samples.

EQUIPMENT Spray Guns — Brushes — Grinding Mills — Banding Wheels — Every Decorating Supply you need.

CHEMICALS Everything you use from the Batch Plant to the Decorating Lehr.

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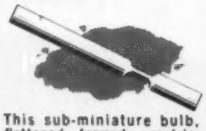
hermetically sealed in glass and evacuated!

Recent developments have demonstrated that transistors must be sealed hermetically in glass and evacuated to protect them from the effects of heat, humidity, contamination, corrosion.

Only KAHLE Equipment provides automatic means for producing dependable Transistors hermetically sealed in glass and evacuated . . . at high production . . . at low cost . . . and in sub-miniature dimensions.

Kahle also produces the automatic Sealing and Exhaust Equipment as well as the automatic Welding Equipment for producing the transistor components.

This sub-miniature button stem is produced on a KAHLE machine.



This sub-miniature bulb, flattened, formed, constricted and tubulated is produced on a KAHLE machine.

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OIL BURNERS . . .
(*Continued from page* 311)

which fires one #54 drilled burner (area 0.002377 sq. in.) with a fuel input of 15.92%. The oil pressure range from 50 to 80#, with oil flow from 180 to 215 gallons per hour. The atomization air pressure is controlled at 24 lbs. at the burner. This furnace melts and produces between 85 to 95 tons of Flint glass on approximately 5 sq. ft. per ton pull. The checker volume is 6½ times the sq. ft. melting area.

The fuel consumption efficiency of any furnace or burner system is influenced by the variable factors of glass composition and color, furnace construction, size and material design, checker volume and type, also size of the openings in the checker, size and design of air valve, stack characteristics, amount and type of insulation, and many others.

In reference to this burner system, determined on a balanced furnace design approximately 80% clay and 20% fused cast refractories and having a conventional 6″ x 6″ superduty fire brick checker setting, melting and producing glass on 5 sq. ft. with glass composition of very good melting properties and considering the variable factors in this system to the ideal.

No. 1 Furnace (208 sq. ft.) fuel consumption is 70 gals. per ton; No. 2 Furnace (440 sq. ft.) fuel consumption is 50 gals. per ton; No. 3 Furnace (198 sq. ft.—end port) fuel consumption is 65 gals. per ton, which is about 5 gals. per ton more efficient than the same size side port; No. 4 Furnace (458 sq. ft.) fuel consumption is 48 gals. per ton.

These fuel consumptions *all* measure up to standard practice in the industry for these size furnaces.

These furnaces would have a span of life in operation of 18 months melting Flint glass and 22 to 23 months melting Blue glass, with one or two hot checker repairs. The fuel consumption at the end of these runs would be increased from 30 to 35% of the initial gallons per ton.

The furnaces are at present constructed of clay bottom, of fused cast refractory blocks, both in the melting and refining chambers, fused cast port bottoms, tuckstones and breast wall which are insulated with sillimanite or mullite brick, and a sillimanite or mullite back gable wall insulated with first quality fire brick. The checkers in all furnaces are constructed of basic 6″ x 6″ basket weave setting.

These super refractory furnaces will operate for 36 months without any repair required to the furnaces or checkers, so that there would be no loss of production due to furnace or checker failure. The fuel consumption at the end of a 36-month run would increase 15 to 20% of the initial gallons per ton, or about ½ as much in relation to the balance furnace design, but they will require 8 gallons of oil per ton of glass more than at the beginning of a balanced furnace campaign. The 8 gallons, or approximately 16% increase, in the idle load of the super refractory furnace, is broken down as follows:

4 gallons, or 8% *increase*, in the fuel rate due to the increased radiation loss of the fused cast blocks in the side walls and nose wall of the furnaces.

4 gallons, or 8% *increase*, in the fuel rate due to the 6″ x 6″ openings of the basic basket weave checker setting.

There is some work being done on the value of insulation applied to the fused cast refractories and we

have received drawing for 4½" x 4½" basket weave setting from both basic material manufacturers.

In conclusion, this burner system is not upheld to be any better or worse than other heavy oil systems used on furnaces operated about the country but it has been used in our plant for some 28 years with very much success.

DR. F. F. SHETTERLY OF CORNING GLASS RETIRES

The retirement of Dr. F. F. Shetterly, Manager of the Laboratory and Pharmaceutical Sales Department of Corning Glass Works, has been announced by Russell Brittingham, Manager of the firm's Technical Products Division. Olaf M. Loytty, Assistant Manager of the Laboratory and Pharmaceutical Sales Department, was appointed to replace Dr. Shetterly.

Dr. Shetterly, a former member of the Chemistry Department of Cornell University, joined Corning Glass Works as a member of the laboratory in 1912. In 1915 he was transferred to manufacturing, remaining there until 1920 when he was appointed to manage the company's Kingsport, Tennessee, plant. When the plant was purchased by Blue Ridge Glass Corporation, a Corning affiliate, in 1925, Dr. Shetterly continued as General Manager. He returned to Corning in 1931 to become Manager of the Laboratory and Pharmaceutical Sales Department. Since that time, Dr. Shetterly has been prominently identified with the scientific apparatus industry and it has been under his direction that numerous improvements have been made in the field of laboratory glassware.

Mr. Loytty, a native of Corning, joined Corning Glass Works in 1933 as a laboratory assistant. Two years later he entered New York State College of Ceramics at Alfred University and received his degree in 1939 when he rejoined Corning. In 1942 he entered the Army, rising to the rank of Major in the Surgeon General's office. Following his discharge, he joined the Laboratory and Pharmaceutical Sales Department as representative in the Chicago area. He was named Assistant Manager of that department in 1949.

X-RAY DIFFRACTION SCHOOL TO BE HELD IN SAN FRANCISCO

North American Philips Company, Inc., and its western dealers, will hold the First Western X-Ray Diffraction School at the Sir Francis Drake Hotel in San Francisco during the week of August 24-28, according to a recent announcement. The new school will be repeated annually on the West Coast as the result of many requests from scientists in the area who have asked the company to duplicate the program which has been so successful in the New York territory during the past seven years.

Morning sessions of the school will be devoted to lectures and afternoon meetings will involve laboratory demonstrations using the latest types of equipment. This work will cover powder camera techniques, the X-Ray Diffractometer techniques, and the new X-Ray Spectrograph techniques. On Friday, August 28, the school will devote the day to actual application problems from the field and speakers will discuss details on methods currently in use around industrial laboratories and in plants.

Q How many companies can supply the full line of glasshouse lime and limestone products?

- ☐ a. 199
- ☐ b. 18
- ☐ c. 146
- ☐ d. 1
- ☐ e. 78

A One and only one—the National Gypsum Company—can supply the full line of glasshouse lime and limestone products. Gold Bond High Calcium and Dolomitic Limestone ... Gold Bond Dolomite Fluxing Lime and Hydrates ... Gold Bond Low-Iron Calcium Carbonate ... also pottery and casting plasters.

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ANCHOR HOCKING NAMES SALES MANAGER

Anchor Hocking Glass Corporation has announced the promotion of Edward L. Superka to the post of District Sales Manager of Northern California. He will be in charge of sales for the Pacific Coast Closure Division of Anchor Hocking, and for Maywood Glass Company, a subsidiary of the parent company.

Mr. Superka succeeds F. C. Maywood, who has been transferred to Toronto, Canada, as Sales Manager for Anchor Cap & Closure Corporation of Canada, Ltd. Joining Anchor Hocking in 1943 as a sales representative, Mr. Superka served for five years in Chicago before transferring to the San Francisco office in 1948.

A. P. GREEN APPOINTS TRAFFIC MANAGER

K. C. Dillman has been appointed Traffic Manager of the A. P. Green Fire Brick Company. Prior to his promotion, he was assistant to L. M. Wallace, who recently retired as General Traffic Manager after 34 years of continuous service with the firm.

Mr. Dillman, who has been with the company for a number of years, will work out of the St. Louis office.

• The Mechanical Engineering Department of the Massachusetts Institute of Technology will present the 1953 Industrial Packaging and Materials Handling technical short course educational program next October in Boston. The four-day short course will begin on October 19.

KIMBLE NAMES PLANT MANAGER

Edward P. Spence has been named Manager of the Kimble Glass Company's new television bulb manufacturing plant at Sayreville, New Jersey. Production of the all-glass rectangular television bulb will begin there after the work of remodeling and equipping the plant is completed in September.

Mr. Spence joined the glass company in 1933 as a clerk in the Vineland plant and has advanced through various assignments in industrial engineering to Manager of the Warsaw, Indiana, plant, the position he has held since 1947.

L-O-F LEASES FLOOR IN NEW YORK SKYSCRAPER

Libbey-Owens-Ford Glass Company has leased for a long term of years the 23rd floor in the new glass and aluminum-faced, 26-story, air-conditioned office building under construction at 99 Park Avenue in New York City, it has been announced by Norman Tishman, President of the Tishman Realty & Construction Company, Inc., builder-owner.

The transaction will give Libbey-Owens-Ford approximately 6,550 square feet of tower space for its New York sales office, located at 570 Lexington Avenue since 1934.

• Adrien A. Poirier has been appointed head of the new architectural department of the Alsynite Company of America, fiber glass building panel manufacturing firm.

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Container Plants • Tableware Plants
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TWO LYNCH L10 Glass Bottle Machines. Both have had complete overhauls and have been modernized with booster drive cylinders, four-way takeouts, etc. Priced advantageously for immediate shipment as is. Subject to prior sale. F.O.B. Brockway, Penna., for domestic shipment. Brockway Glass Company, Inc., Brockway, Pa.

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HELP WANTED

TECHNICIAN for testing laboratory of glass container manufacturer in Maryland. Reply Box 132, c/o The Glass Industry, 55 West 42nd St., New York 36, N. Y.

PANGBORN PLANT EXPANSION

Pangborn Corporation has announced the completion of a new addition to its production facilities in Hagerstown, Maryland. The new structure has been designated Building No. 8.

Designed with adequate head-room for the production of new, taller, automatic blast cleaning equipment, the building is 65 feet wide and 205 feet long. One five-ton and one ten-ton crane have been installed in the building to facilitate materials handling in the production area. The importance of materials handling is indicated by the expenditure of $50,000 for truck loading docks out of the total $300,000 cost of the building.

• The Fourth Annual Ferro Corporation $500 First Prize Award for the best student paper on porcelain enamel technology was presented to Frederick D. Olympia, an Alfred University student. Second prize winner was Richard G. Rion, of Clemson College, who received $300.

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MCKEE GLASS DIVISION CONSOLIDATES NORTHWESTERN SALES

The McKee Glass Division of Thatcher Glass Manufacturing Company, Inc., has appointed the firm of Cahill & Galbraith of Seattle, Washington, as its Northwestern representative, according to an announcement by company officials. The firm will operate under the direction of McKee's Pacific Coast Territory Manager, John B. Miller.

Under this new appointment, Cahill & Galbraith, who formerly handled McKee sales only in the western portions of Washington and Oregon, will now add the eastern part of these two states, plus Montana and Idaho.

OHIO STATE NAMES DEAN OF ENGINEERING

Gordon B. Carson, former engineering faculty member at Case Institute of Technology, has been named dean of the College of Engineering at Ohio State University. The new dean will succeed the late Charles E. MacQuigg, who died April 1952.

Mr. Carson's professional experience includes both college teaching and research, as well as employment as an engineer in private industry.

• Clairmont-Nichols, Inc., guild opticians in New York City, became the first optical dispenser in the country to offer for sale sunglasses containing the new Natural View neutral sunglass lens, developed by the L. J. Houze Convex Glass Company, which prevents color distortion for the wearer. The optician has made the lens available in regular sunglasses and for prescription glasses.

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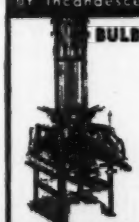

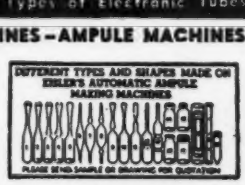
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